PREVIEWS: 1-2-3 5.0 FOR WINDOWS, COMPAQ ELITE NOTEBOOKS

BUSINESS GUIDE TO ONLINE INFORMATION

PC WORLD

August 1994 $3.95

First Look!

Windows 4.0

Start

Explorer...

Hands-On Guide to Explorer, Shortcuts, Info Center, Plug and Play, Multimed

Revolution on the Desktop?

Plus

Pentium-90, DX4-100, SX2-50 PCs

Fax Software Shoot-Out

Backup Hardware and Software

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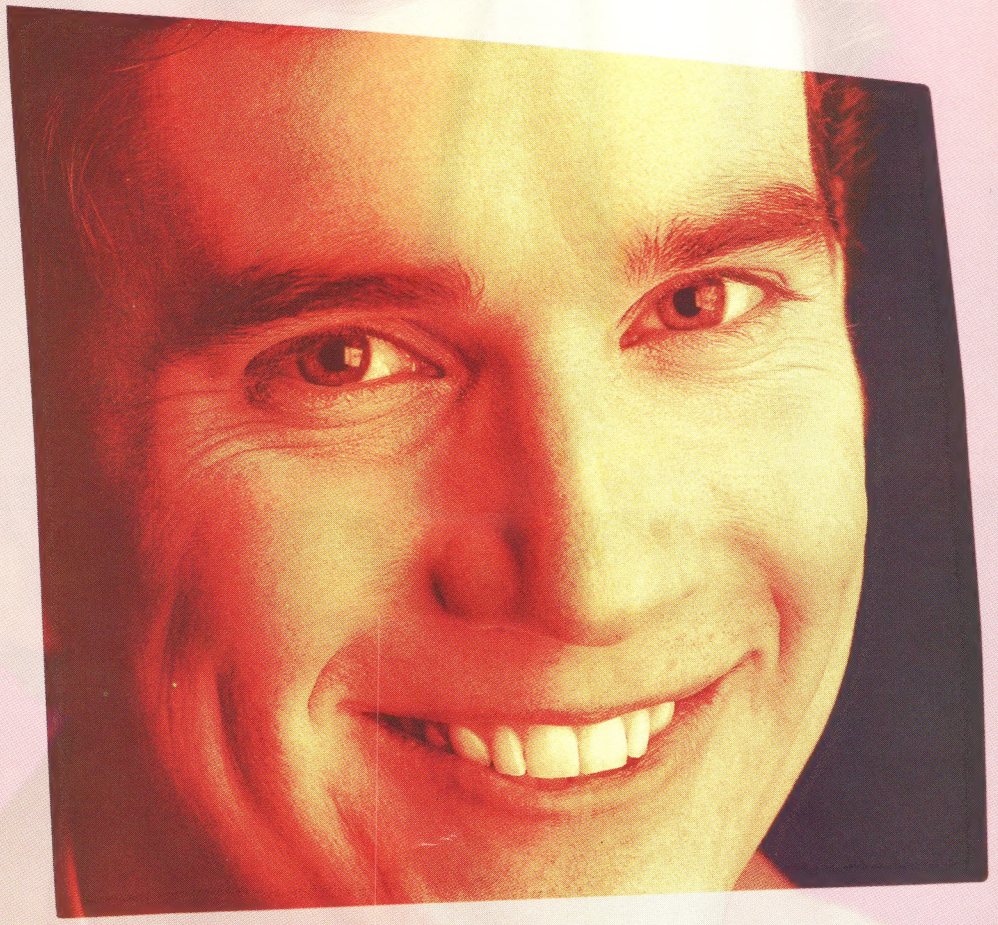

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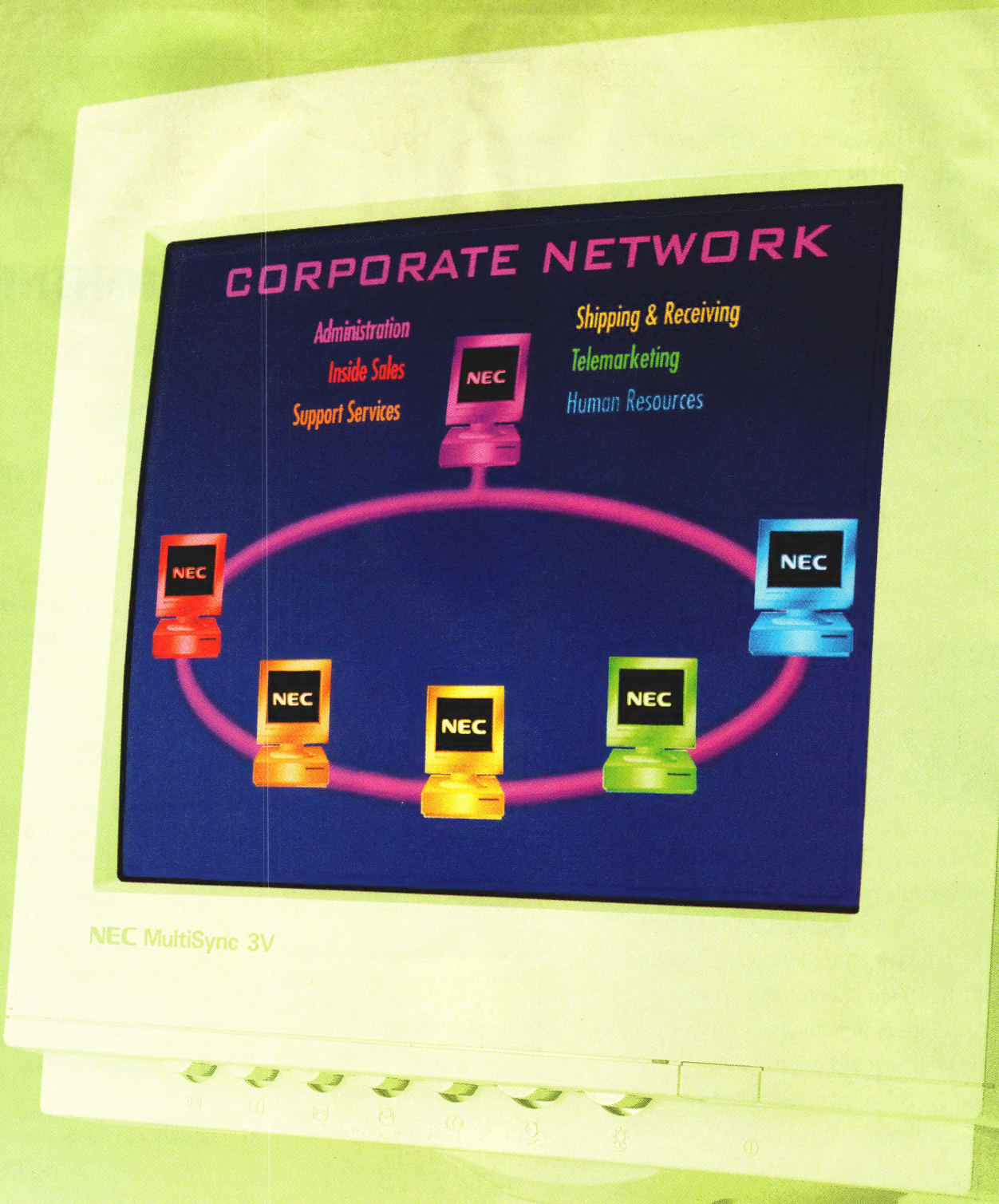

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66MHz PRICES.

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Winbench 4.0				
	DOSmark	Graphics WinMark	Disk WinMark	Winstone
Blue Lightning 100MHz[1]	719.9	9.76	1,243	58.7
486DX2/66 Average[2]	592.7	9.50	861	49.5

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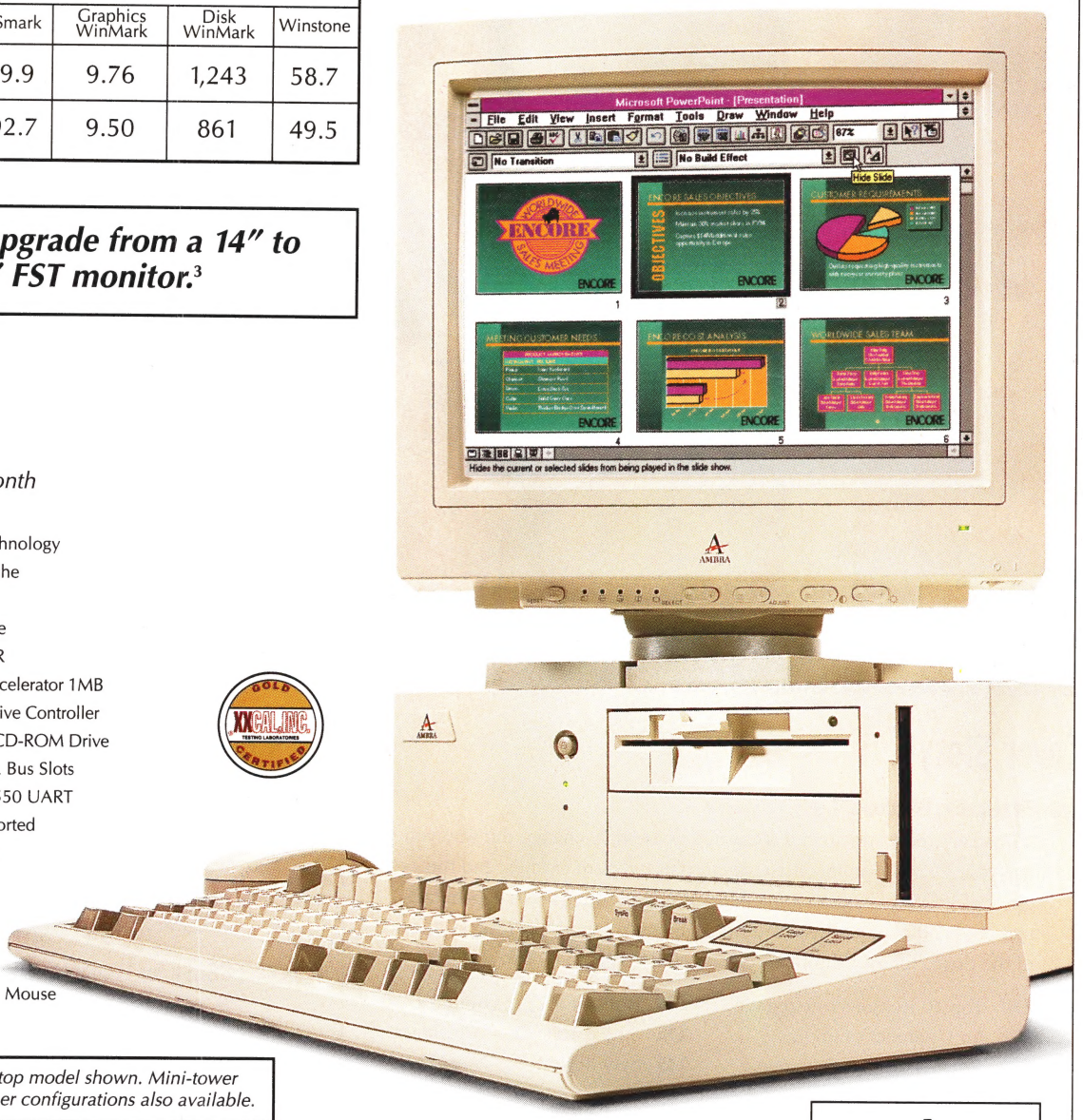

Desktop model shown. Mini-tower and other configurations also available.

1 800-200-1466

be available in certain locations. Offerings may differ in Canada. Prices do not include shipping. Return shipping and insurance charges are the responsibility of the customer.[1]AMBRA results independently tested 3/31/94. [2]From PC Magazine, December 7, 1993. [3]Limited time offer expires 8/31/94. Applies to 60MHz or faster processors. [4]All manuals are on the CD. Printed manuals can be purchased directly from Borland® and WordPerfect.®

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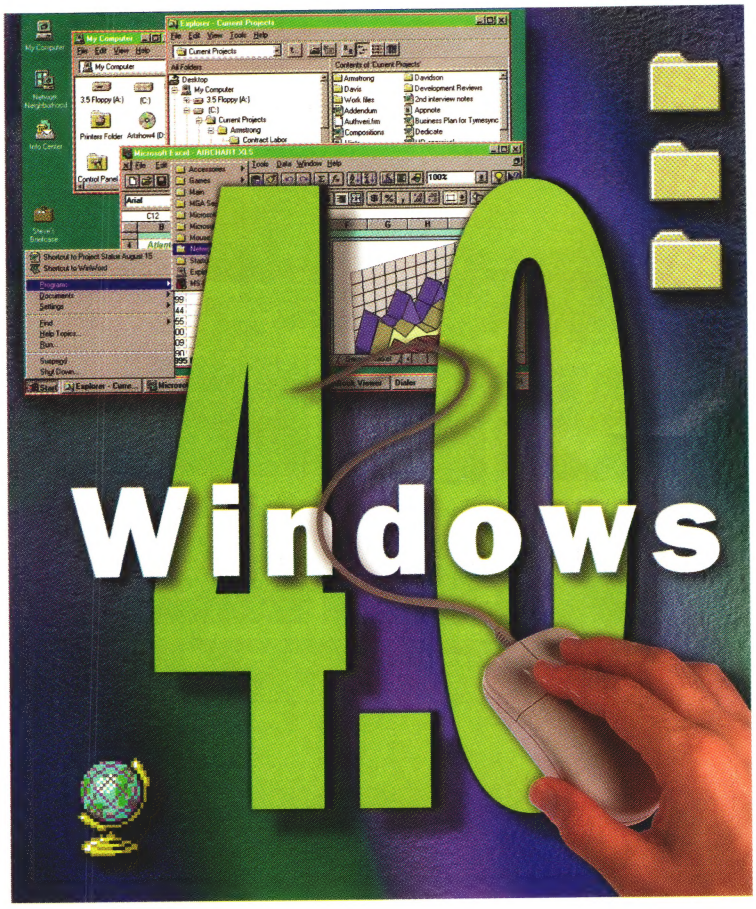

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Cover photography by Robert Cardin, digital composition by TX Uniimited/San Francisco

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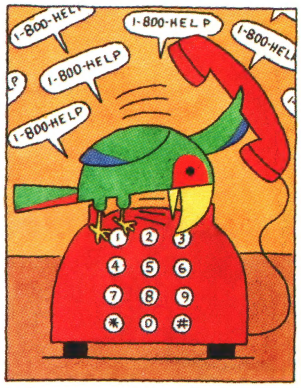
Here's How



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- *PC/Computing* BEST (May 1994)
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PC Magazine said: "ZEOS Pantera-66 combines quality features, good price, and high performance.... A consistently above-average performer on all our benchmark tests...."

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486DX-33	**$1645** Lease $60/mo.	**$1995** Lease $72/mo.	**$2395** Lease $87/mo.	**$2945** Lease $107/mo.
486DX2-66	**$1745** Lease $63/mo.	**$2095** Lease $76/mo.	**$2495** Lease $90/mo.	**$3045** Lease $100/mo.
DX4-100	**$1995** Lease $72/mo.	**$2345** Lease $85/mo.	**$2745** Lease $99/mo.	**$3295** Lease $108/mo.
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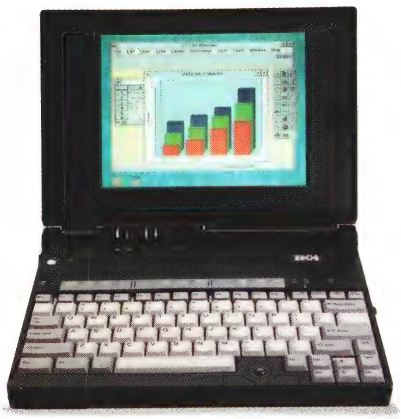
- NiCad battery & AC adapter
- 81-key keyboard, built-in mouse key
- Serial, parallel, VGA, keyboard ports
- MS-DOS 6.2

486SL-33 $1695



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PACKAGE 1

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- Internal 3.5" 1.44MB floppy drive
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- Local bus video, 512K video RAM
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- NiMH battery & AC adapter
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- Serial, parallel, external video, mouse port

486SX-33 $2195

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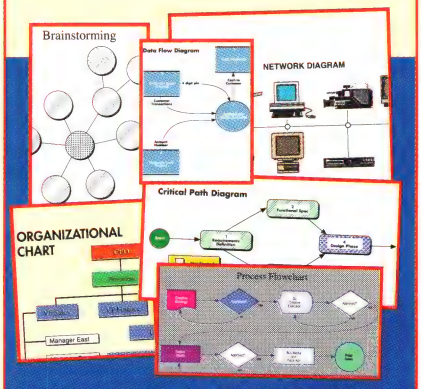

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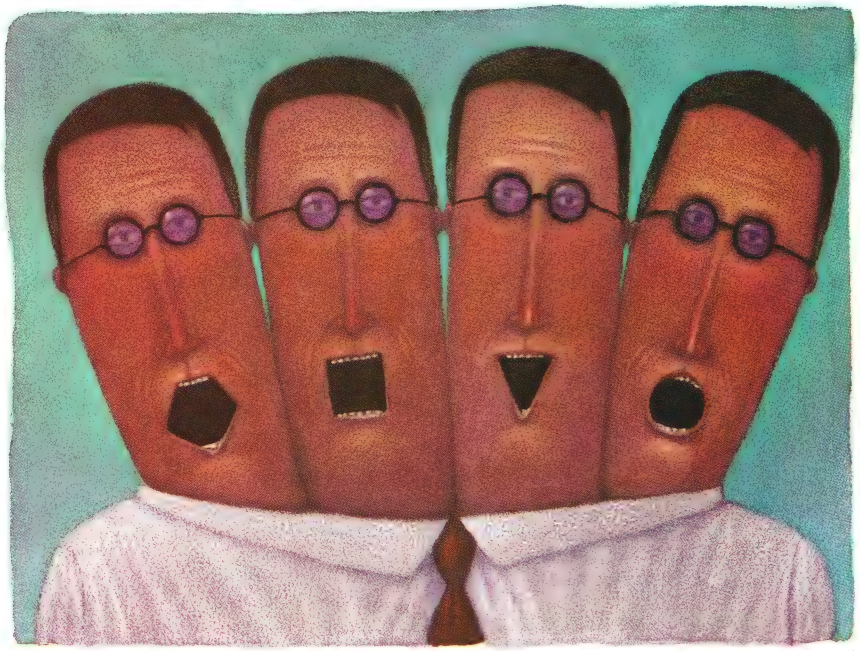

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Windows 4.0, Pentium-90s and DX4s, More Service Commendations

Weeks before we received the first official beta of Windows 4.0, Senior Editor Steve Fox spent a few hours using a pre-beta version at Microsoft and a few days using a slightly earlier version. Whether you've become a Windows partisan or longed for defenestration, you'll find Steve's article on 4.0 a treat. His experience confirms the enthusiasm of those of us on staff with more limited exposure: When Windows 4.0 redecorates our screens, we'll no longer have to feel we've sacrificed a four-star lifestyle on the altar of good business sense, writing off the superior experience of using the Mac to claim the greater diversity, freedom, and price and performance of the multivendor PC.

The emerging user interface of Windows 4.0 builds on simple concepts. Those of us who upgrade will start at Start, rummage in My Computer and Network Neighborhood, take a Shortcut more intuitive than a Mac *alias*, and then explore more powerfully with Explorer. Gone is the counterintuitive tug-of-war between Program Manager and File Manager, although Microsoft plans to preserve this option for masochists and MIS managers addicted to high training costs in other people's budgets.

The new Windows looks so good that we can quit complaining about all the CPU cycles it wastes and start anticipating the intuitive appliance and splendid medium the PC can now become. We can stop thinking of computers primarily as devices for traditional computing tasks. The first goal of processing power is to make PCs easy for ordinary people to use—not only to crunch numbers, balance books, and edit text, but also to seek and filter information, increase knowledge, and broaden experience. The cycles used by Windows 4.0 are accomplishing this task—to make the computer so easy to use that it can be both an appliance and a medium for the masses at work and at home.

To be a successful medium, the computer must present information as realistically as possible. Full three-dimensional modeling with ray-tracing and interactive simulations of virtual worlds are both fine tasks for computers viewed as a medium. The first step toward verisimilitude in a world dominated by television is displaying high-resolution video at 30 frames per second—broadcast quality. Pre-beta Windows 4.0 on a DX2-66 provides better video in bigger windows. With luck, Windows 4.0 will ship by year-end, and Pentium-90s running the new version will be able to unpack large windows of MPEG-compressed video at high frame rates. Even if that date proves optimistic, prospects are close enough and rich enough to merit an outpouring of educational, entertainment, and reference titles for the PC.

With Windows 4.0, we'll no longer have to feel we've sacrificed a four-star lifestyle on the altar of good business sense.

The Future Is Now: Top 20 Power Desktops

Paced by dazzling, surprisingly affordable new models from Dell, Zeos, and Gateway, Pentium-90 systems have already swept 5 of the 9 top spots in the Power Desktops Top 20, with more in the pipeline for September and October. "Power mobile PC" is practically synonymous with DX4-75, with the Gateway ColorBook DX4-75 and Ambra N75D-340 edging out the Acer AcerNote 780cx and NEC Versa 75EC Notebook for Best Buys. Combining all desktop and mobile entries in both power and budget categories, DX4 systems fill no fewer than 10 spots in this month's Top 20s. Although the CompuAdd C466D and three others fought off the challenge, Dell's OptiPlex 450s/L broke into the top 5 in the budget desktops category with its surprisingly good performance.

Service Commendations

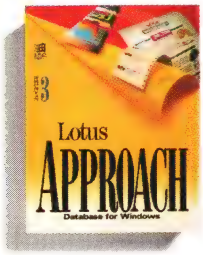
Though some vendors voice their disagreement with our findings in this month's *Letters*, several vendors are using the results of our June report on reliability, service, and support to improve their operations and their customers' satisfaction. Acer, Ambra, and Zenith Data Systems (ZDS) are especially eager to make specific improvements based on information your 45,000 faxes provided. Micro Express has launched a study of its packaging to determine whether our reader poll uncovered a problem it can address promptly.

Ambra, Micron, and Ares are among the companies most convinced that a greater number of responses about their products will show dramatic improvements. ZDS also pointed out that our report appeared just before the results of the company's major service upgrades could show up in our data. We're hard at work processing the more than 150,000 additional faxes we've received since analyzing data for our June article. In order to maximize the number of respondents for all brands, we intend to analyze all the new data before publishing a comprehensive brand-by-brand update in October. See this month's *Consumer Watch* for additional comments on the June article.

Phil Lemmons

Phil Lemmons, Editor in Chief

MICHELE CLEMENT



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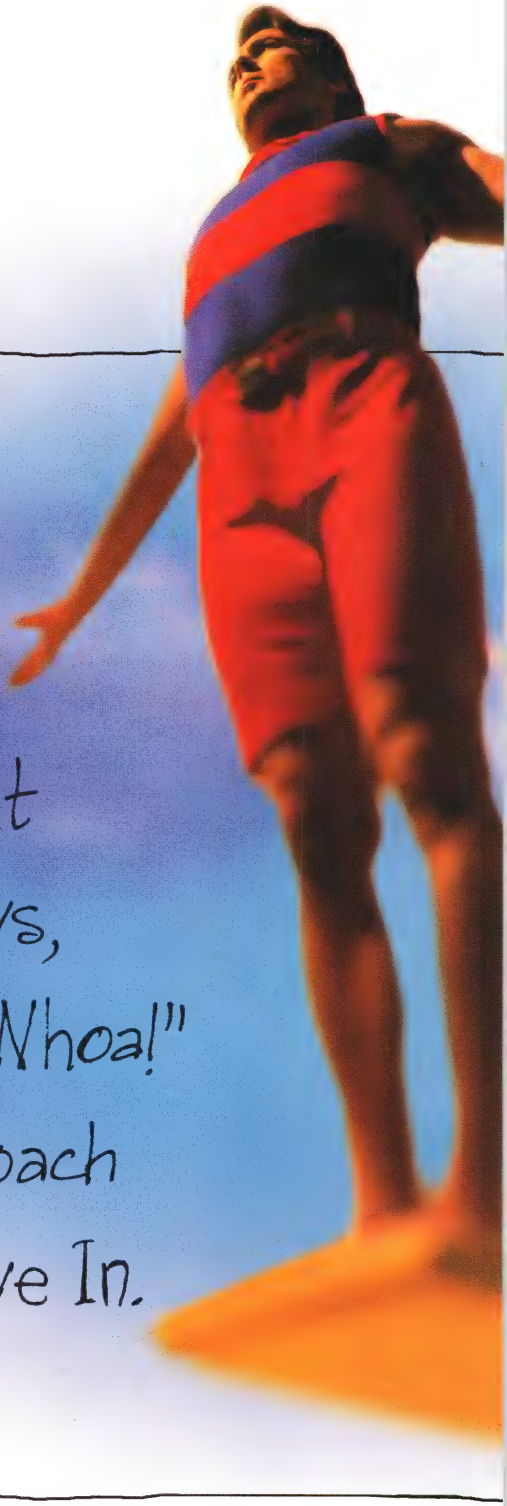

You've never really been into databases. Yet some people use them for everything. But something inside you says, "Databases? Programming? Whoa!" Well, the new Lotus Approach makes it easy as 1-2-3... Dive In.

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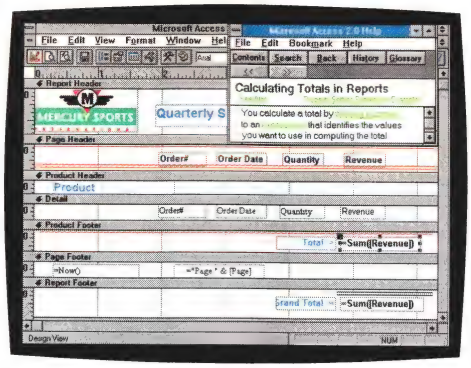
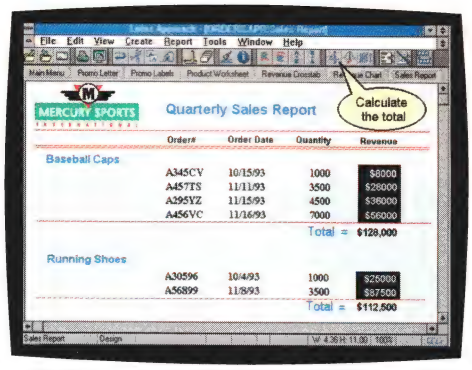


Constructing a report in Access? "Easy"?



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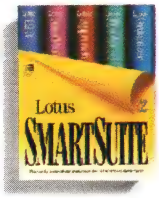

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Circle 49 on reader service card

PC Companies Dispute Results of Reliability and Service Report

In your June special report ["Your New PC: DOA or Destined for Glory?"], Ares Microdevelopment was listed in the "Reliability Ranking" chart under the heading of "Worst." This listing is inaccurate for the following reasons:

First, Ares is mentioned nowhere else in the articles ["Most Likely to Succeed...or Fail" and "Help Is on the Way...But When?"]. In particular, the omission of our name from the "Service Ranking" chart suggests a printing or tabulation error.

Second, the sidebar "A Word About the Numbers" claims that you gathered data on 41 companies, but there are 44 listed in the "Reliability Ranking" chart. This also suggests a printing or tabulation error.

Third, the cutoff for inclusion in the article was 50 faxed responses. Although you've told us Ares received 51 responses, we believe this number is far too small to generate a statistically accurate ranking—in any category.

Finally, your failure to include the number of responses received by each company does a great disservice to readers. According to your own records, 84 percent of respondents—whether reporting a problem or not—would purchase from Ares again.

What's particularly puzzling about this is that *PC World* gave Ares a Top 20 award just a few months prior to this article. Moreover, we've received a five-star service ranking in *PC/Computing*'s Direct Top 60, as well as the Better Business Bureau's Gold Star award for three years running.

Equally puzzling is the fact that although the survey was meant to be based solely on responses from your readers, you chose to visit five manufacturers. Why wasn't Ares on that list? We would have welcomed you then, and we welcome you now, to come out and see what makes us so special. Do only the largest manufacturers warrant *PC World*'s attention?

After the June issue hit the stands, we received a tremendous outpouring of support from our customers, for which we're very thankful. The PC World area on America Online was stuffed with letters, as was the Ares Users Group on Prodigy. Of all the companies mentioned in your story, regardless of ranking, none generated even a fraction of this kind of online response.

Ares has always made service and reliability its number one priority and will continue to do so. We guarantee 100 percent customer satisfaction.

Steve Wagstaff,
president, Ares Microdevelopment

I would like to make a few observations about the June reliability and service report, particularly in regard to Austin Direct, an IPC Technologies, Inc., company.

Austin Direct is building an industry-leading service group, and we were dismayed at being omitted from the service section of your special report. The review of our Premier 486 System on page 145 of the June issue testifies to the level of service we provide. In your own words, our support is "impressive," and "hold times average less than 2 minutes." Furthermore, you mention that most customers who reported hardware problems via your Reliability and Service Monitor said those problems were resolved to their satisfaction. It is ironic that because we didn't have enough customers with problems, we were omitted from your June service appraisal altogether!

To provide a perspective for potential and current customers, we would like to highlight our performance rankings with the 46 folks who did have difficulties. According to your staff, 80 percent of those customers were taken care of to their satisfaction, 76 percent would buy again, and 65 percent were very satisfied. All of these scores are above average. It seems evident that Austin Direct would have rated highly in your survey if we'd had the requisite number

SPECIAL REPORT RELIABILITY & SERVICE

Your New PC:
DOA OR DESTINED FOR GLORY?

THE EXPERIENCE OF 45,000 PC WORLD READERS TELLS THE FUTURE OF YOUR NEXT PC

Most Likely to Succeed...or Fail

BY DANIEL TYNAN AND CHRISTINA WOOD

of inconvenienced participants.

We have implemented several improvements to our service operation over the last few months. We have more than doubled our support staff, we have purchased a state-of-the-art call processing system, our average speed in answering calls has been reduced from 5 minutes to less than 2, and our depot repair turnaround has gone from almost five working days to less than three. Austin Direct is committed both philosophically and financially to being an industry leader in providing service.

All our current measurements—both the internal data we collect and the external feedback provided by our customers—indicate that we deliver a sound product at an impressive value. Our goal of less than 2 percent of DOA [dead-on-arrival] systems is demonstrated daily at our end-of-the-line audit stations. Our unwavering commitment to 24-hour burn-in ensures problem-free delivery and outstanding reliability.

ROBERT CARDIN

Clearly, surveys that solicit responses do not favor companies with smaller installed bases. We at Austin Direct encourage *PC World*'s editors to use proper random sampling techniques in your next survey to provide a fair and accurate representation of both service and reliability for all participants, regardless of sample size and market share.

Jeff Thomas, director of services, Austin Direct/IPC Technologies

In your otherwise excellent article on reliability and service, Cornell Computer Systems was included as a company with a "Worst" Reliability rating based on a poorly analyzed collection of anecdotes.

Admittedly, *PC World* made an honest attempt in fine print on pages 130–131 to explain the many and serious limitations of the survey analysis, but that fine print was no match for the simple graphic on page 120, which formed powerful and lasting impressions. Page 130 states, "[the survey's] results are not statistically projectable either to the larger base of *PC World* readers, or to PC owners in general." Yet that is exactly what you implied in the graphic [page 120]. Nowhere in that listing is there an attempt to explain that the "results contained in these articles are valid only as statements of the personal experiences of those readers who returned a survey to *PC World*," as stated in the small print on page 130.

The 45,000 survey responses represent about 5 percent of *PC World*'s readership, assuming no one sent in multiple responses, while the 64 total responses naming Cornell represent about 0.14 percent of the survey sample. Essentially, *PC World* judged and condemned Cornell as among the worst based on an "analysis" of 0.007 percent of its readers.

Had the sampling been random—that is, if any given user had an equal chance to receive a survey—the results would have been meaningful for *PC World* readers; however, it included only readers who hoped to win a prize or had an ax to grind or just had the time and interest to complete a survey. The fact that 5 percent or fewer readers chose to respond, even with a bribe, greatly diminishes the claim that the effects of reporting bias were minimized. Additional biases include the nature of *PC World* readers, the type of computing they do, and the computers they own. For *PC World* to say it "is not inherently biased in favor of any particular brand" is to show a serious misunderstanding of its readership.

The employees of Cornell Computer Systems take great pride in our quality control, service, and workmanship. We were dismayed to see these efforts cast aside in a mere sidebar without explanation or validity. It is our hope that *PC World* takes the same pride in its craft and addresses the shortcomings in an otherwise worthwhile endeavor to address quality and service in the PC community. We prefer to believe that when honest intent and execution are practiced on both sides, good things will ultimately emerge.

Charles Lin, president, Cornell Computer Systems

With regard to Insight Direct's ranking in your June Reliability and Service Special Report, I would like to share some of

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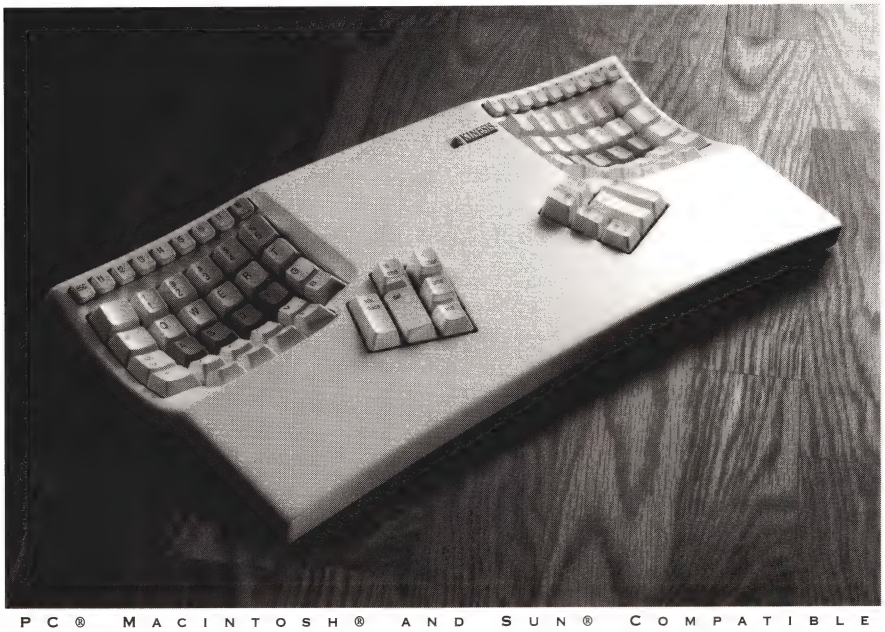

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Insight's internal customer satisfaction results. Insight conducts a random telephone survey of our customers on a monthly basis, and the results show an average overall customer satisfaction rating of more than 95 percent. Our survey also shows that over 97 percent of Insight customers would recommend Insight to others. *[Insight's survey results reflect the opinions of all Insight customers, not just PC buyers. —Ed.]*

The results of your survey are not statistically projectable to either the larger base of *PC World* readers or PC owners in general. In addition, the limited number of responses you received from Insight's customers is not a fair representation of the company's customer base. Insight has nearly 1 million customers, and we have determined—through random sample surveys—that the majority view their experiences with Insight as favorable. As always, we will strive to improve our reliability and service in a constant effort to realize our goal of 100 percent customer satisfaction.

Eric Crown, CEO, Insight Direct

We were distressed to see Micro Express rated in your June feature as poor in reliability, particularly in terms of the number of machines reported DOA.

Of the 45,000 surveys that were returned to you, only 17 reported one or more components DOA in Micro Express computers. This is hardly a representative sample of the tens of thousands of PCs Micro Express ships each year. Our internal records indicate that fewer than 1 percent of the PCs we ship arrive damaged. We consider any damage of PCs in shipping to be unacceptable, and we are taking steps to improve our packaging to cut this already small number to an even smaller one.

Micro Express goes to great pains to have the finest support and service in the industry; unfortunately, no discussion of our service made it into your article. If a part fails, Micro Express offers 24-hour express replacement service. Micro Express computers are burned in for 72 hours before they are shipped to eliminate early failures. In addition, we provide a toll-free number for free unlimited technical support. If technical documents are required, we offer automated fax-back service.

While there are some fly-by-night manufacturers in the PC business to which you should alert your readers, Micro Express is not one of them. *PC World* has awarded us numerous Best Buys. In your August 1993 issue you not only ranked our 486DX2-66 the best of the Best Buys, you said, "If you want fantastic service and support backing an incomparable system that's so fast it could almost have won without any help—here it is."

I hope that this sets the record straight. I know that tens of thousands of happy Micro Express users will agree that the rating needs to be disputed.

Art Afshar, president, Micro Express

I am compelled to point out several facts regarding your coverage of Ambra Computer Corporation that were not relayed in your June Reliability and Service Special Report.

Ambra's rating in the reliability section is a gross misrepresentation of the data: It ▶

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than an eye-popping screen. This is very much the high performance notebook. It comes with a powerful Intel 486 processor, up to 75MHz. Local bus architecture combined with hardware accelerated graphics deliver up to 16 million WinMarks.

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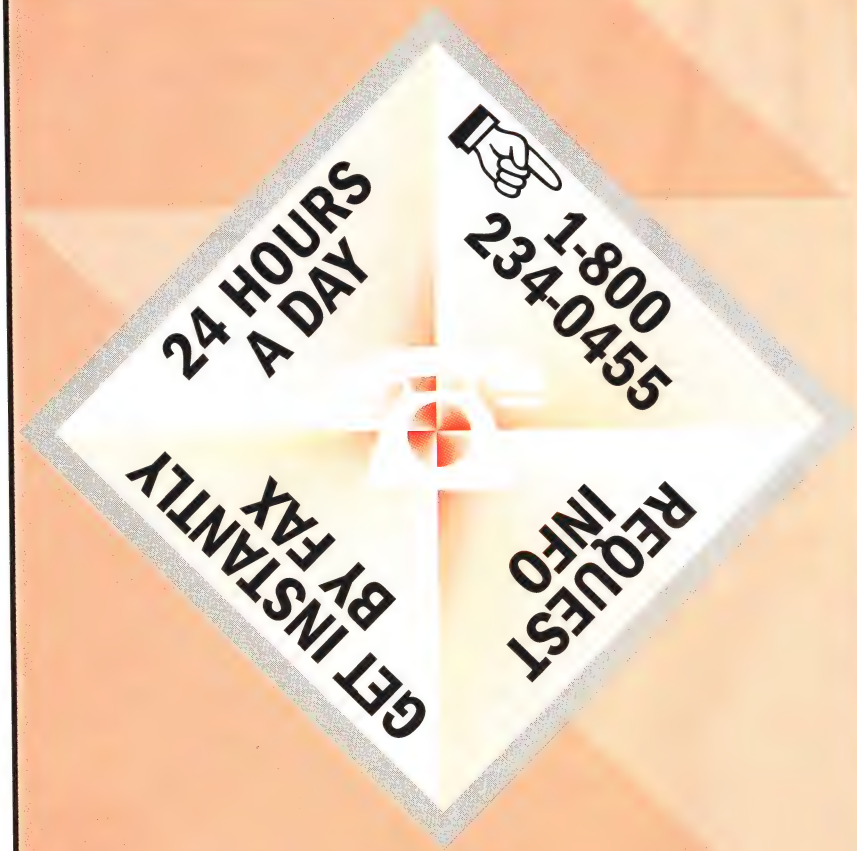

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PC WORLD

was based on only 66 Ambra responses, 27 of which indicated they had a hardware-related problem. The results are obviously not valid, given that Ambra's installed base at the time numbered in the tens of thousands. By your own admission the data in the special report is not statistically projectable "either to the larger base of *PC World* readers, or to PC owners in general; and the results contained in these articles are valid only as statements of the personal experiences of those readers who returned a survey to *PC World*." If the data is not statistically projectable, how could you even rank Ambra?

In the area of service, your data showed that Ambra scored above average in the percentage of customers who indicated they would buy the same brand again. However, because *PC World* did not receive at least 50 responses from Ambra customers rating us on service and support, you reported only on the incidence of problems, not on their resolutions and customers' willingness to buy from Ambra again.

It is unfortunate that *PC World* did not boldly list the number of responses each vendor was judged on or balance the findings when a vendor did not receive what you considered enough responses to afford a mention in the service section. To categorize Ambra's reliability based on 27 responses is entirely inaccurate and unfair.

David B. Middleton, president and CEO, Ambra Computer Corporation

Credit Where Credit Is Due

The answer to the August 1993 *Help Line* item "Put Color in DOS" is substantially based on a contribution of mine that was published in *PC World*'s *Star-Dot-Star* column about ten years ago. I believe you should have noted that the answer was based on my earlier contribution.

John T. Bagwell, Jr., El Segundo, California

Editor's response: You're quite right. Derivations of your COLOR.BAT batch file have been around for so long that I no longer remembered where it originally came from. Our hats are off to you, both for your long-lived contribution and for being a loyal *PC World* reader for a full decade.

—Karl Koessel

Letters *welcomes your responses and ideas.* *(See page 12 for contact information.)*

IN THE WILD, THEY'RE KILLERS. IN BUSINESS, THEY'RE LIFESAVERS.

QMS 860 Hammerhead Print System
600x600 dpi • 11" x 17"/A3 • SRP $4595

QMS 860 Plus Print System
1200x600 dpi • 11" x 17"/A3 full edge-to-edge • SRP $5999

Dominant. Powerful. Precise. That's the formidable character of the QMS® 860 Hammerhead™ Print System. It's fast, compact and capable of remarkably accurate printing without hesitation.

And now the world's most popular 11 x 17/A3 laser printer is available with all of the features of the QMS 860, plus 1200x600 dpi resolution output...the powerful 24 MB QMS 860 Plus!

These desktop printers are creatures like no others - able to operate in mixed environments of PC, Macintosh® and workstation systems with standard and optional interfaces. Yet, with all their impressive power, they are both surprisingly affordable.

Others see them as killers. You'll see them as lifesavers. The QMS 860 and 860 Plus Print Systems. The perfect printing machines.

FEATURES	BENEFITS
• QMS 860 – 600x600 dpi output • QMS 860 Plus – 1200x600 dpi output	High resolution for camera-ready originals or accurate prepress proofs
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• QMS Crown™ technology, featuring multitasking, advanced job spooling, compile-ahead processing, context switching and virtual memory	Increases print job responsiveness, provides a platform for convenient, cost-effective enhancements and enables peak performance as a network node with interfaces supporting protocols that include EtherTalk,™ NetWare® and TCP/IP
• Compatible with a variety of languages including PostScript™ Level 2 and Level 1, HP PCL® and HP-GL®	Accommodates the latest application software on all major platforms
• SIO (Simultaneous Interface Option)	Accepts data streams on all ports simultaneously to increase system responsiveness for all users
• ESP (Emulation Sensing Processor)	Eliminates user intervention to select compatible printer language
• 39 resident type fonts, all with multilingual character sets	Flexibility and creativity for document production
• An international network of service and support organizations in over 230 metropolitan areas throughout the U.S. and around the world	Fast, local response to service and support requirements
• Several convenient service plans that include on-site response within an average of 4 hours, emergency service and other options	Flexible programs designed to be just right for your needs
• Our exclusive Q-Fax (800-633-3850 or 205-633-3850) and CompuServe® (GO DTPVEN) services at your fingertips 24 hours a day	Quick and easy access to a full range of information and support
• Full one-year warranty	Parts and labor coverage for the important components of your print system
• Emergency telephone support	Direct dialog with technical experts
• On-site installation available	Experts to assure fast, trouble-free installation

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PC MAGAZINE EDITORS' CHOICE™
November 23, 1993
QMS 860 Print System

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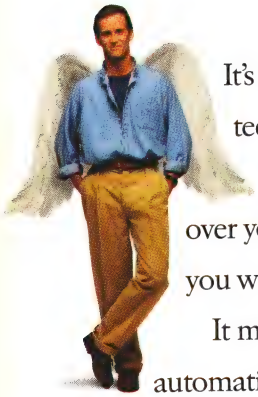
LOOSELY DEFINED, IT'S THE T
OF HAVING A G



It's called IntelliSense™ technology. Simply stated, it watches over you and even helps you when you need it.

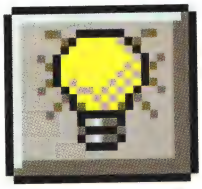
It makes routine tasks automatic and complex jobs easier – a direct result of intense research into how people use computers. And an indication of where the future is going.

And all the programs that make up the Microsoft® Office have this intelligence built right in.

Allow us to elaborate, if we may.

As you're thinking about your work, your software is too. Studying your keystrokes. Taking notes. Sensing what you want to do and making suggestions. Even doing a hundred or so of the everyday processes for you.

What does this mean? You save time. You're more productive. But you've no doubt heard this before. Let's get to the specifics.

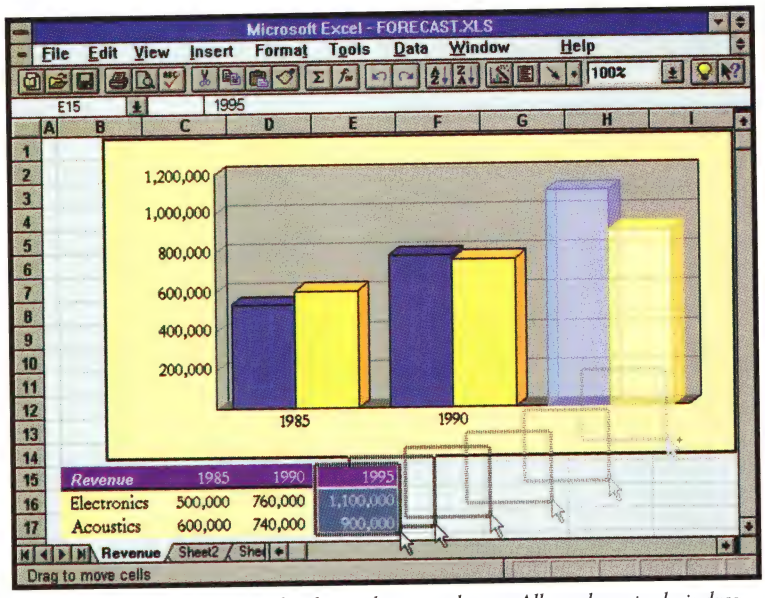


The TipWizard™ assistant watches you work and suggests easier ways to do things.

Say you're writing a letter in Microsoft Word. With a feature called AutoCorrect, your most common typos can be corrected as you make them. For example, "teh" is automatically replaced with "the." Or you can use it as a high-tech shortcut. Just type "asap" and it's replaced with the words "as soon as possible."

Then hit AutoFormat to create a great-looking document fast. All you have to do is get your ideas down and click, it's a memo. Click, it's a report. Click, it's a letter.

Want to personalize those letters for each customer? Using the Mail Merge Wizard in the new Microsoft Access® database makes it a snap to link customer lists to your word processor.



Charts and graphs can now be changed in a single step. All you have to do is drag your new data into place, drop it, and everything is updated automatically.

You can even use AutoReport to see, with just a click of the mouse, which customers generate the most revenue. So you'll get the most bang for your buck.

Naturally, you may need to analyze those figures in a Microsoft Excel spreadsheet. Great. You can look at customer data in a variety of ways with PivotTable™ dynamic views. By product, quarter, region.

*Support for the Microsoft Office is no-charge; however, normal telephone company charges apply. Microsoft support services are subject to Microsoft's then-current prices, terms, and conditions, and are subject to change without notice Mail workstation license (server and software must be acquired separately). For information only: In the 50 United States, call (800) 894-6642, Dept. JGF. In Canada, call (800) 563-9048. Outside the U.S. and Canada, call your local Microsof Microsoft Access are registered trademarks and IntelliSense, PivotTable and TipWizard are trademarks of Microsoft Corporation.

ECHNOLOGICAL EQUIVALENT
UARDIAN ANGEL.

Any way your heart desires.

Now say you have some new

Wizards track your every move and guide you step-by-step through a variety of tasks.

figures you want to add to a chart. Drag-and-Plot makes it easy. Step one, drag the numbers from your worksheet and drop them into your chart. Voilà, there's your updated chart. There is no step two.

Certainly, work like this merits a little showing off.

How about a slide presentation? The AutoContent Wizard that's in PowerPoint® will help you get started by organizing the structure and content of your most common presentation topics (selling your product, for instance).

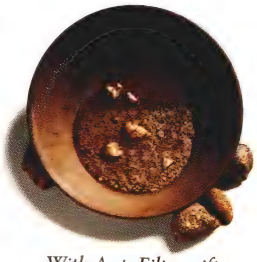
Teh

The

With AutoCorrect, commonly misspelled words are corrected in a blink.

But perhaps the smartest aspect of these best-selling programs is this: They are the only products of their kind that have unlimited product support with no service charge.*

Which brings us back to the point we made a few hundred words ago: Only the Microsoft Office does so many things to make your job easier to do. Because only the Microsoft Office has IntelliSense technology.

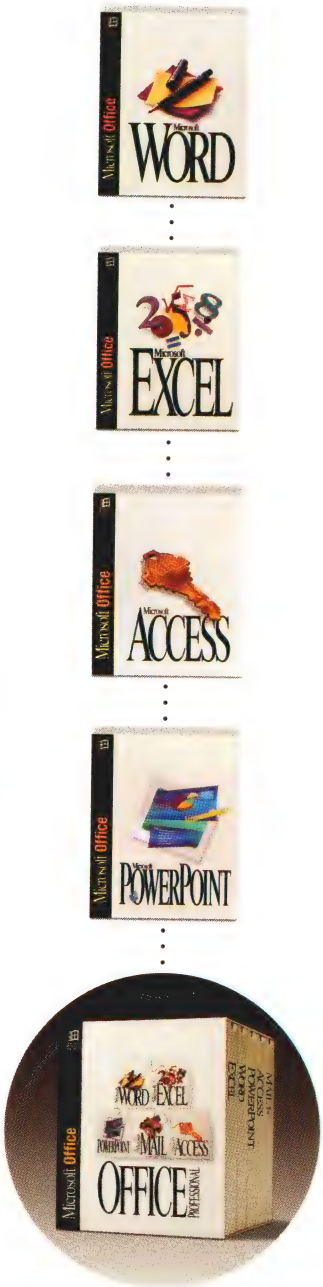


With AutoFilter, sift through a spreadsheet to find specific nuggets of information.

Of course, mere words can never do justice to software like this. So we invite you to visit your reseller, or call us at (800) 894-6642, Dept. JGF, for the name of a computer store near you.

After all, it never hurts to have someone watching out for you.

In this case, it just happens to be your software.



Microsoft Office

994 Microsoft Corporation. All rights reserved. Microsoft Office Professional, shown here, includes: Microsoft Excel, Word, the PowerPoint presentation graphics program, the Microsoft Access database management system and a sidiary or (206) 936-8661. Customers who are deaf or hard of hearing can reach Microsoft text telephone (TT/TDD) services by calling (800) 892-5234 in the United States or (905) 568-9641 in Canada. Microsoft, PowerPoint and

Customer Alert

dBASE users discover FoxPro 2.6 falls short

"FoxPro 2.6 fell well short of the claim in [Microsoft] ads that 'the unique AutoMigrate feature lets you move your existing dBASE files effortlessly into FoxPro.'"

"FoxPro for Windows crashed several times when generating a project involving dBASE code."

"When we attempted to migrate our art gallery management system to FoxPro, the whole process was frustrating."

"Microsoft officials reported that the problem was that FoxPro is unable to handle certain dBASE statements."

"This reviewer, a dBASE user and programmer, tried unsuccessfully to "AutoMigrate" the target application rather than performing the relatively laborious task of learning a complex new software platform. In the end, however, that is what FoxPro 2.6 required."

"Besides these compatibility shortcomings, there are also design flaws that make 2.6 unsuitable for a tentative user."

PC WEEK review exposes compatibility flaws

May 16, 1994

The closer dBASE® for Windows gets to shipping, the more Microsoft seems compelled to cover FoxPro compatibility flaws with untrue marketing claims. Perhaps they've seen how easy dBASE for Windows makes it for all developers to create great Windows database applications using their existing knowledge of dBASE. Perhaps they've seen how naturally applications created with dBASE for Windows can be upsized to client/server applications. Perhaps they've seen how its new "Plug-and-Play" Architecture makes dBASE for Windows totally open to work with your favorite tools and important local and SQL data.

Whatever the case, reacting by claiming that FoxPro addresses dBASE customer's needs is irresponsible. But don't take our word for it. Read the May 16th *PC WEEK* review for yourself.

Build your database strategy on superior technology, not marketing hype

Visual design tools, full use of Windows, reusable object-oriented code, and seamless compatibility are what you've asked for. And that's exactly what you get in dBASE for Windows. dBASE will set the standard for data management and database application development for a long time to come. We know because our customers who have tested beta versions of dBASE for Windows are telling us, "thanks for taking the time to make it right." Borland has been the leader in the database market for many years. And if there's one thing we understand, it's that when it comes to your data, it has to work right the first time. dBASE for Windows is your best path from DOS to Windows and client/server.

Reserve your copy today. Be the first to get dBASE for Windows. Call now!

1-800-336-6464, ext. 9150

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Circle 16 on reader service card

Reliability and Service: Other Voices

Since our June special report on reliability and service, "Your New PC: DOA or Destined for Glory," hit the streets, we have been inundated with responses from PC users wanting to tell us their experiences. The following is just a sampling of the letters we have received to date. For responses from PC companies that were included in our June report, please see *Letters* (page 19).

We had not received sufficient information about respondents' service experience with several companies in our June "Reliability Ranking" to include those vendors in our "Service Ranking." We expect that many of those companies, however, will be included in our updated ranking in the October issue, when the base of responses will be significantly larger. Since our June article, we have received 150,000 additional faxed-in responses.

Make *your* experience count—fax us a completed copy of this month's Reliability and Service Monitor (page 168), and let us know how you rate your PC company. —*Roberta Furger*

Ares: Worst or Best?

I was surprised by the low Reliability rating given to Ares and curious why it was not rated in the Service or Overall categories. I've had outstanding support from this company, and the reasons that I needed help had nothing to do with reliability. Ares gave support in the areas of upgrading and expansion.

On my recommendation, a friend purchased a computer from Ares. Forty-eight hours after he got the unit, the monitor went fuzzy. A call to the company had a new computer on the way via Next Day Air, and Ares even picked up the original monitor. It has been my experience that reliability is only as good as support.

John Ratcliff, America Online

Sorry—but something is seriously wrong. I don't know how you came up with the "Worst" Reliability rating for Ares. My system is now more than two years old. I've added drives, cards, modems, and so on, with no problems. Not one burp. Ares's tech support has been great—I needed it once for a noisy power supply. The company sent a new one right away. I think you had better take another look at your data.

William B. Guy, America Online

Another Gateway Fan

The article "Your New PC: DOA or Destined for Glory" truly struck home. Last December after four months of agonizing review, I ordered a Gateway 2000 Pentium computer loaded with extras. The only hesitation I had was the thought, What if something goes wrong? I had been using computers for only a few months and would not have begun to know how to tweak software or hardware problems.

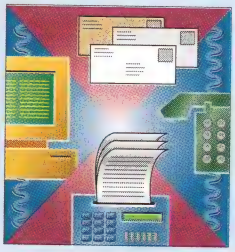
About three weeks from the date of my order, the computer arrived. A friend helped me set it up. Things seemed to be working fine, but after 30 minutes the screen locked up. My friend rebooted, and everything was okay the rest of the day. But on day two, the screen locked up twice; by day three, it would freeze after only a few minutes of use.

I got through to Gateway 2000's technical support in about 30 minutes. The people at the other end of the phone were extremely professional and very good at talking me through options that might fix the problem. However, nothing worked. A Gateway technician authorized Dow Jones [until recently, Gateway's on-site–service firm] to replace the hard disk, motherboard, Pentium chip, and power supply. The only problem was a shortage of parts, which prevented Gateway from responding in a timely manner. A Dow Jones representative made the repair within two days of receiving the computer hardware. Dow Jones took care of all the paperwork and billing and returned the replaced items to Gateway.

Would I purchase another computer from Gateway 2000? Yes. It was not Gateway's fault there was a shortage of Pentium replacement items.

Gene Townsend, San Antonio

KEEPING UP



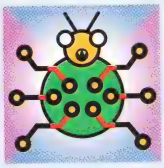
Say good-bye to the one-year warranty. Effective in June, Gateway 2000 joined the elite ranks of a handful of PC companies offering a three-year warranty on desktop computers. Unlike many other three-year warranties, however, Gateway's warranty includes the monitors sold with systems. Other recent Gateway "upgrades" include bundling Microsoft Office Professional (which includes Word, Excel, PowerPoint, Mail, and Access) with many of its business-class systems and offering double-speed CD ROM drives on all systems...

Compaq meets America Online: In May Compaq launched its new America Online forum, where customers can get information on products and services, download files from the software library, and ask Compaq personnel technical questions about hardware and software problems. Responses on the forum are quick—the Compaq representative typically posts an answer to questions within 24 hours, if not sooner.

By Roberta Furger

ROBERT HOLMGREN

BUG WATCH



Act 2.0 for Windows

Since the latest version of Symantec's Windows-based contact manager shipped this spring, users have reported numerous problems. These include the inability to read notes and histories in files imported from earlier versions; truncated fields in databases imported from the previous version; excessively long database conversions from previous versions; improper display of Note text with unchangeable default font; problems importing Act for DOS (CCD) files; difficulty generating Completed Activities reports; difficulty editing groups using the View, Groups function; no updates made to Mini Day Calendar when working on a group and adding calls; and loss of changes made to contact record fields if Critical Alarm activates during editing.

The general manager of Symantec's contact management division, Steve Singh, acknowledges that Act 2.0 for Windows does suffer from "a handful of minor bugs." The company was due to release an interim version, 2.01, in mid-June to solve most of the problems listed here. To receive the upgrade, call Symantec customer support, or download it from CompuServe (GO SYMANTEC).

Many of the above problems may be caused by files corrupted in earlier versions of Act. Company technical support personnel suggest a work-around: Export databases from earlier versions to an interim CCX format (an Act for DOS format). From there, import the data into version 2.0. This process removes corrupted data, though it truncates some fields in the process. "It's true that 20 fields in the contact screen get truncated," says Singh, adding "there's a warning in the documentation about it." Singh says version 2.01 will provide a data file compress and reindex command to repair corruption without truncating data.

Symantec customer support 800/441-7234
Symantec technical support 503/465-8645
Fax-on-demand technical notes 800/554-4403

WordPerfect 6.0 for Windows

WordPerfect has released WordPerfect 6.0a for Windows, which a company representative says improves the program's reliability, speed, and ease of use and adds more features than we have room to mention here. The upgrade is available by mail free of charge to all registered users of WordPerfect 6.0 for Windows. Or order the upgrade by fax. First download an order form entitled REGISTER.ZIP from CompuServe's WordPerfect forum (GO WORDPERFECT), then fax it in. (You'll find the fax number on the form.)

According to WordPerfect, the upgrade speeds up basic formatting, document navigation, printing, and importing of WordPerfect 5.*x* documents. It also handles fonts more capably: WYSIWYG character widths display more accurately on screen, and conversion of WordPerfect 5.*x* documents to 6.0 format now works properly (as long as you've selected the same printer in WordPerfect 5.*x* and WordPerfect 6.0a for Windows). The new version also notifies you of problems with certain 256-color video drivers and tells you to add a compensating command line switch to the program's launch command if the program detects an offending driver.

Like the AutoCorrect feature in Microsoft's Word 6.0 for Windows, WordPerfect 6.0a's new QuickCorrect feature automatically fixes misspelled words and expands predefined abbreviations on the fly. The update also simplifies text selection and incorporates an uninstall utility and a Transition Advisor that helps WordPerfect for DOS users make the switch to Windows word processing.

WordPerfect upgrade orders 800/321-4566

PC DOS 6.3

Last month's column reported several bugs in IBM's PC DOS 6.1, along with fixes available online. IBM's recently released version 6.3 of the operating system incorporates most but not all of the solutions we reported in July. If you encounter a divide overflow error when PC DOS's SSTOR/DOS utility attempts to mount a DoubleSpace compressed volume file (a situation that can occur with a compressed volume file smaller than 16MB created with DOS 6.0 or 6.2), you'll still need to download the updated DOS system file IBMDOS.COM. You can find the fix on CompuServe (GO PCDOS) as IBMDOS.ZIP.

IBM PC DOS technical support 800/992-4777

—Scott Spanbauer

Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with the broadest interest.

Scott Spanbauer is a contributing editor for PC World.

What Are They Doing Wrong?

In the sidebar "At a Glance: Quick Takes on Reliability and Service" ["Your New PC: DOA or Destined for Glory"], you asked why Tandy had received such a low buy-again rating from its customers.

For many, many years, Tandy has been notorious for marketing outdated technology on hardware that uses proprietary parts for upgrades.

I own one of the original Tandy 1000 computers. Like so many others who were sucked in by the glitz of Radio Shack retailing, I purchased the machine out of ignorance rather than knowledge. I depended on the sales personnel to provide information about a technology that I didn't understand very well.

Throughout its marketing history, Tandy has been lacking when it came to technology's cutting edge. The most recent example: When everyone else was marketing 486s, good ol' Radio Shack was still selling 386 machines at top-shelf prices.

Michael Jones, Forest, Ohio

Service Is What Counts

As you can see from the results of your Reliability and Service Monitor, many people care about the way their problems are handled and not so much about how many problems their computer has on arrival. After calling Gateway's sales department for three days trying to *order* a computer and getting a constant busy signal (as I did), anyone would wonder what it would be like to have a technical problem with one of Gateway's machines.

I opted to purchase a computer from

Introducing Delrina WinFax PRO™ 4.0. You'll wonder how you ever faxed without it.

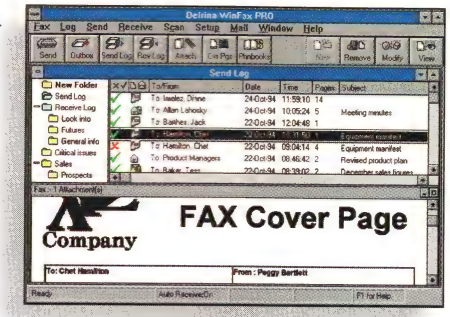
Meet the fastest, easiest, most convenient way ever to handle all your faxing – new Delrina WinFax PRO™ 4.0, the latest version of the best-selling fax software in the world. The only one that combines the advanced faxing features you need with astonishing new ease and usability.

"The best fax package there is."

That's what *PC/Computing* said about version 3.0. And now we've made it even better.

Starting with the revolutionary new streamlined interface that makes it simpler than ever to do anything you'd do with a fax machine, and a lot more. Like sending faxes directly from within any Windows application as easily as you'd print. Or organizing sent and received faxes in convenient folders. Or converting faxes into word processing documents with OCR.

There's added convenience with dozens of ready-to-use cover pages. Fax phonebooks that are drag-and-drop simple. And improved fax annotation tools that even let you add your signature.



Based on extensive usability testing, the new customizable interface includes folders for organizing sent and received faxes.

Don't try this with a fax machine.

Imagine faxing, not just an image of a document, but the actual file itself*, so it's ready to be used in an application. Imagine sending a single document that is automatically faxed to some people and e-mailed to others.

Now imagine you're on the road, and WinFax PRO automatically forwards faxes to you. Or lets you retrieve faxes sent to your regular fax number*. And there's more.

Get new Delrina WinFax PRO 4.0 today and put faxing where it really belongs – on your PC. Call now for information or to upgrade from WinFax PRO or WinFax LITE™. Or see your local dealer to upgrade immediately.

DELRINA
1-800-268-6082

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*Requires Class 1 modem.

Circle 99 on reader service card

It Walks, Talks ... And Listens!

Portable Computing With Built-In Business Audio.

No matter how hectic your pace, our 450 Colorscan stays with you every step of the way. It's light-weight, powerful, and packed with features, including complete business audio, dual scan display, PCMCIA slots, and optional mini-docking station. So whether you're on the road or in the office, you're in control!

Built-in business audio includes preloaded Audio Applications software, a microphone that, lets you anotate your work, speakers that enable you to present it, and the freedom to use external speakers and microphones if you choose. The dual scan display means your presentations will look as good as they sound. And PCMCIA makes adding additional peripherals a snap. Snap-in a mini-docking station and you can integrate your Colorscan into your office system with a single clip. So you're up and running the moment you sit down – on the road or at your desk!

450 Colorscan

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- ❑ *4MB RAM Expands To 8MB Or 20MB*
- ❑ *250MB Hard Drive*
- ❑ *1.44MB 3.5" Floppy*
- ❑ *9.5" Dual Scan Passive Matrix Display*
- ❑ *Local Bus Video Controller With 512KB Video RAM*
- ❑ *Two Type 2.0 or One Type 3.0 PCMCIA Slots*
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- ❑ *Built-In Business Audio. External Speaker and Microphone Jacks*
- ❑ *6.5 Pounds Including Battery*
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(Lease For $131/mo.)

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MICROSOFT® WINDOWS™ READY-TO-RUN

yes NetWare Tested and Approved

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Circle 73 on reader service card

one of the companies rated "Worst" in your "Reliability Ranking." My computer has not been turned off in 12 months, and I use it every day. I have added extra boards and tape backup with no problems. The one time a small problem arose, the company handled it quickly and promptly.
John Wallace, Islamorada, Florida

Shop Talk

Getting Tax Help

I'm outraged at the practices of ChipSoft, maker of TurboTax. Last year after waiting a reasonable time to receive a product I'd ordered, I made several attempts to reach the company by phone but got only a recorded message. I wrote a letter to the company and finally received my order.

This year my experience was even worse. In response to a very appealing mass mailing, I ordered five ChipSoft products. My check cleared in December, but I received nothing. In January I received another mailing saying I had limited time to order and get the advertised price. I suspected my order might have been mishandled, so I called the company. After numerous attempts, I got a live person on the line. The representative said ChipSoft had my order, but for some reason he couldn't explain, it had not been shipped. He said he would refer the matter to customer service. I waited another two weeks. Still no software. So I wrote a letter demanding immediate shipment or a complete refund.
Edward R. Jones, Centreville, Virginia

Editor's note: Last year we received a number of complaints from ChipSoft customers who couldn't get through to the company (see "The Electronic Filing Nightmare" in February's "Taking the Pain Out of Taxes"). At the time, ChipSoft assured us this problem would be remedied before the next tax season. And in fact, we received very few complaints from ChipSoft customers this spring. A spokesperson for Intuit (which purchased ChipSoft in December 1993) told us the company had vastly increased its phone capacity and support staff and reduced the number of busy signals by 84 percent over last year. Unfortunately Mr. Jones's calls were among those that didn't get through. According to Intuit's vice president of sales Alan A. Gleicher, the computer inexplicably held up a portion of Jones's order, so his entire order was placed on hold. Until Jones contacted Intuit, no one had noticed the problem. Intuit sent Jones his software and, to indemnify him for his trouble, an offer of free tax software for next year's tax filing season.

Shaky Tech Support

I recently purchased a Packard Bell computer for home use and am very pleased with its performance. My complaint is that phone access to technical support is terribly inadequate. I lost some of the original software and tried to restore the hard disk using the Multi-Media Master CD. Unfortunately, I found I needed a password to do that. I've spent several days calling Packard Bell to get this password. Each time I call, I get a busy signal or a taped message suggesting other ways to make contact.

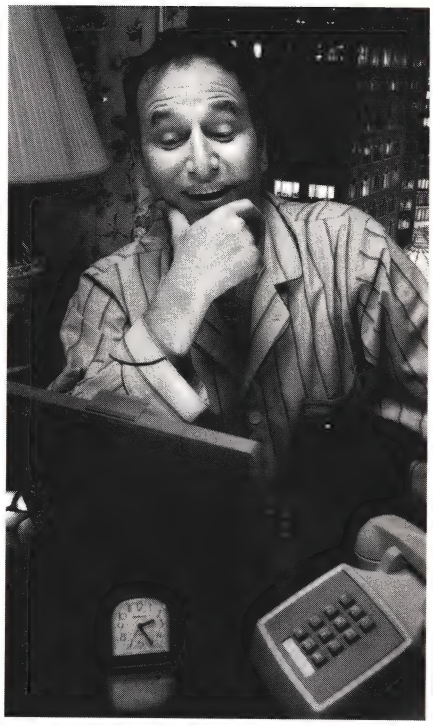
Technical support should be a primary consideration of the company. I only hope I don't run into more serious problems.
Andrew Paul Claes, Kingman, Arizona

Editor's note: After the January earthquake in the Los Angeles area, Packard Bell moved its technical support department to Magna, Utah. Since then, it has been in the process of hiring and training tech support personnel. The phone number for the new facility is 800/733-4411. According to a spokesperson, the new technical support center is bigger and has an improved training center. By the time you read this, Packard Bell hopes to have the new facility staffed to capacity.

Toll Calls From Bolivia

A big name in manufacturing does not always mean a big name in business ethics. I learned this lesson recently when dealing with Northgate Computer Systems.

I ordered a Northgate ZX Portable II for immediate delivery to an associate in Pennsylvania. I needed the equipment for a consulting trip to Romania and was planning to pass through the United States to pick it up. To pay for the machine, I wired almost $4000 directly into Northgate's bank account. Two weeks later, I called Northgate to inquire about my order. They told me the laptop wouldn't be delivered for some time. So I reluctantly canceled my order. I needed a laptop before my trip.



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This morning Jessye Zane, who is very particular about aesthetics, took a moment to admire our windows.

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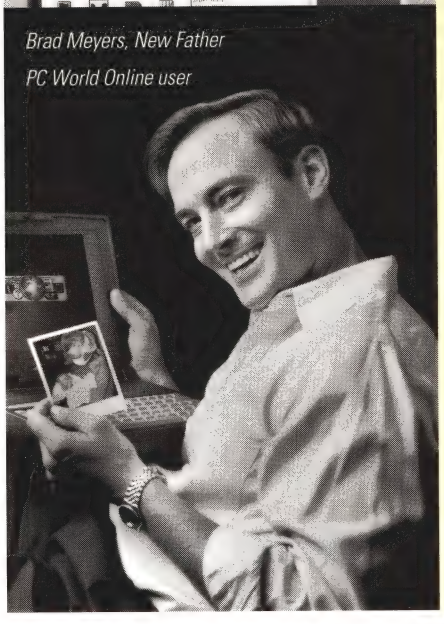

And after a long night's work, Brad Meyers took a few minutes to let two hundred associates know that Joshua Mark weighed 8lbs. 7oz.

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PC WORLD ONLINE

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As an independent consultant, I don't have the resources to extend credit—least of all to my suppliers. So I requested an immediate refund. Three months later, I am still waiting for those funds.
Ronald Boesaart, La Paz, Bolivia

Editor's note: Patrick Brennan, Northgate finance manager, responded with apologies when we contacted the company. Apparently Mr. Boesaart's refund was delayed by an accounting error. Brennan assured us that Mr. Boesaart now has his money and that Northgate has refined its accounting procedures to prevent similar problems.

Bad News From Bothel

I have heard some extremely distressing news out of Bothel, Washington. AutoDesk has decided to end development of its two-dimensional drafting package, Generic CADD. I am a professional land surveyor with a company that has used Generic CADD for over four years. We've produced all our drawings with this remarkable piece of software.

We are experimenting with reasonably priced CAD software because we will not let AutoDesk force us to buy its new low-end version of AutoCAD, AutoCAD LT.
Joseph Welsh, East Sullivan, Maine

Editor's note: According to a representative of AutoDesk, it's true that the company doesn't plan another major revision of Generic CADD. AutoDesk will, however, continue to sell, support, and maintain the program as long as customers require a two-dimensional drafting package. The spokesperson told us that many Generic CADD customers have asked for a Windows program and better compatibility with AutoCAD. Since the Generic CADD code is not easily transported to Windows, AutoDesk developed AutoCAD LT. LT supports many of Generic CADD's features, reads Generic CADD files, and costs about the same as Generic CADD ($495). If, however, you prefer the DOS Generic CADD, there is no reason to switch.

Shop Talk is written and researched by PC World *assistant editor Christina Wood. Think you've gotten a raw deal—or a great one?* Consumer Watch *wants to hear the details. We'll investigate complaints and publish letters with the broadest interest (see page 12 for contact information).*

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MODEL	6468GM	1451GM	1462GM	1562GM	1565GM	1765GM	1785GM
Size	14"	14"	14"	15"	15"	17"	17"
Dot Pitch (mm)	0.28	0.28	0.28	0.28	0.28	0.27	0.26
Hor. Freq. (KHz)	30-38	30-50	30-62	30-62	30-65	30-65	30-85
1600 x 1280 NI	—	—	—	—	—	—	Yes(60Hz)
1280 x 1024 NI	—	—	—	—	Yes(60Hz)	Yes(60Hz)	Yes(75Hz)
1024 x 768 NI	87Hz/I	60Hz/NI	75Hz/NI	75Hz/NI	75Hz/NI	75Hz/NI	75Hz/NI
Mac Compatibility	—	—	Yes	Yes	Yes	Yes	Yes
Flat Square	—	—	—	Yes	Yes	Yes	Yes
Color Match	—	—	—	—	—	Yes	Yes
Digital Controls	—	—	—	—	Yes	Yes	Yes
MPR-II & ISO9241-3	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power Savings	<30W	<30W	<30W	<30W	<5W	<5W	<5W

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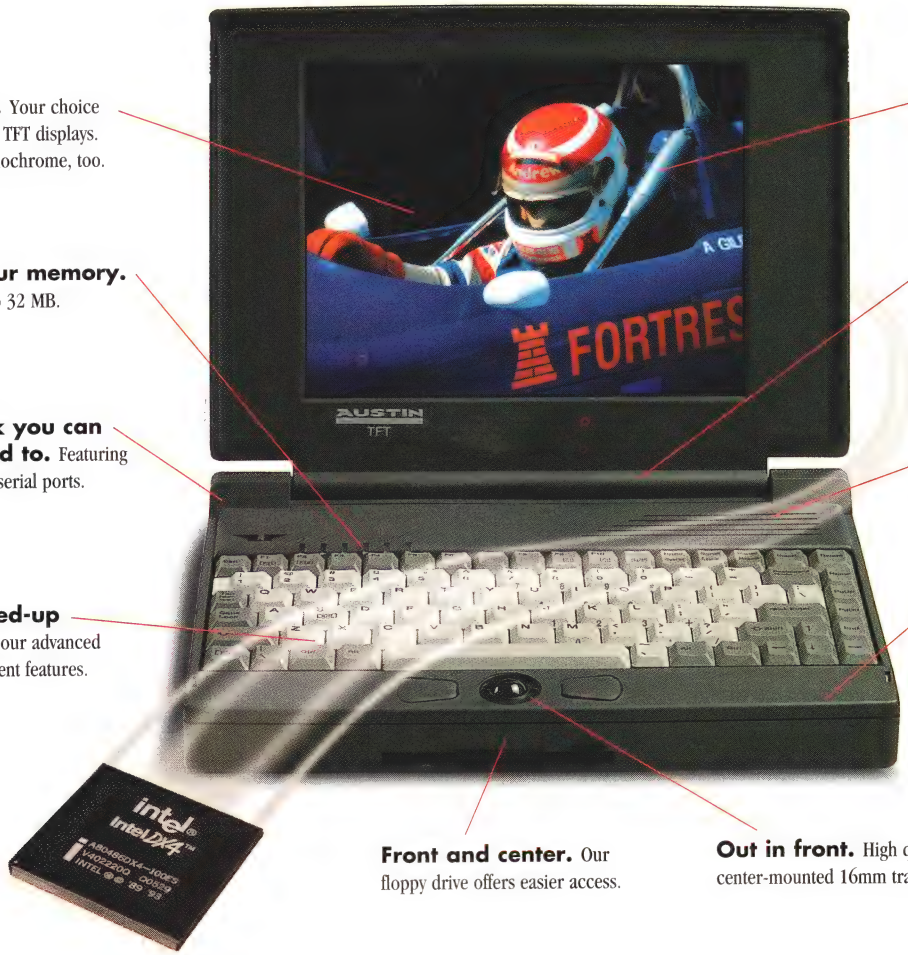

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• Cooling Fan	Yes	No
• 2 Serial Ports	Yes	No

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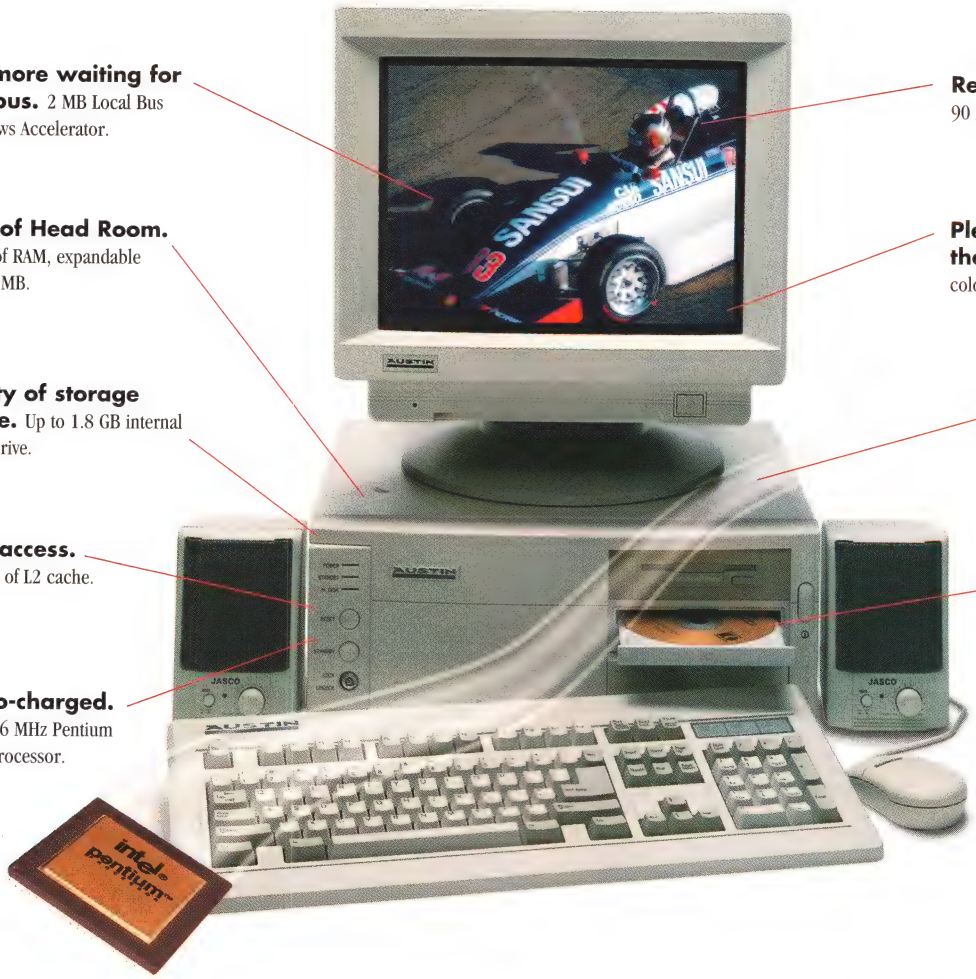

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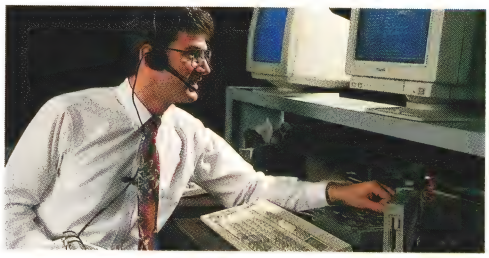

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Consultants on Disk

Starting a new business—or expanding an old one—requires a lot of thought and research. Your options: Roll up your sleeves and do some of the research yourself, hire a marketing consultant for a mere $150 an hour, or experiment with an emerging breed of software designed to help you make informed business decisions. This month Lew Hoff, president of Bartizan Corporation, a multimillion-dollar manufacturing firm with 85 employees based in Yonkers, New York, describes how "MBA-ware" helps steer his evolving business. —*Ed.*

A Born Entrepreneur

I'm a born entrepreneur. I've run a successful manufacturing company for 23 years, and during the past two decades I've experimented with dozens of new markets for my business. An entrepreneurial spirit like mine can be fun, but I have to manage it carefully. If I don't thoroughly understand the market I'm exploring—and don't fully investigate whether my company is really equipped to develop, manufacture, and market a new product—I can wind up in the hole.

In late 1992, I became infatuated with the idea of manufacturing a completely new and different kind of product: a child's car seat that converts to a stroller, with a collapsible handle and wheels that tuck into the seat base. I called the idea "BabyExpress," and I knew it would be a must-have for parents like me who hate to grapple with two pieces of equipment.

My company certainly didn't have the wherewithal to manufacture this product in quantity. In the best-case scenario, we could fulfill only a small percentage of what I imagined would be an overwhelming demand. (Accordingly, BabyExpress would have to be a somewhat pricey product, which would also give it a certain cachet.)

Before testing my idea on our board of directors, I did some market research, using a dial-up information service called Teltech Resource Network (800/833-8330), which searches all the major online services for business literature on products. I checked the Teltech database to find out if there were competitive products. There weren't. Then I talked to some prospective customers; they thought that it was a capital idea. Finally, I broached the subject with the board members, who agreed with the customers .

Lew Hoff is the president of Bartizan Corporation in Yonkers, New York.

BRAD TRENT

This is a nebulous way to check out the validity of a new idea, however. When I use the Teltech database, I ask it questions, but it doesn't ask me any. In reality, customers ask questions, but they really aren't concerned about your profit margins. Board members ask tough questions about areas like manufacturing or engineering, but they might not know the first thing about marketing. And most of my employees tend to tell me what I want to hear.

Tough Questions

While I was considering this new business, I read about a $495 software package called Business Insight from Business Resource Software (800/423-1228). It's a database of 30 management experts' accumulated knowledge. It asks hundreds of questions about finances, products, distribution, and so forth.

In most cases, your answers are rated on a scale of 1 to 10—where 10 is positive. Once you've answered all the questions, the program generates a report based on your scores. It then rates your new venture's chance for success and identifies the strengths and weaknesses of your business, suggests ways to modify your plan.

I decided to check out the software. I particularly wanted to find out whether or not we had the right people for the project and if our marketing strategy made sense.

I spent 30 or so hours answering the hundreds of elaborate, probing questions—things I never would have stopped to think about on my own. For example, it asked me to rate, on a scale of 1 to 10, hundreds of statements such as "Buyer groups have distinguishable, quantifiable characteristics," "Moderate user sophistication is required," or "Rate the bias of the buyer toward solutions other than yours."

Going through the arduous process of answering the questions honestly was well worth the effort. It forced me to look, in detail, at all the interrelated areas of my business, not just those I knew intuitively.

After I finished the analysis, I ran the final report. The report validated the

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PCW8/94

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market opportunity but also told me that we were inadequately staffed to deal with the production issues and that the project as a whole was risky.

For $495, I got the same kind of information I would have received from a marketing consultant, without being charged about $1100 a day for four day's work. And a consultant would have tied up a tremendous amount of my time and my staff's time.

20/20 Hindsight

Despite the software's somewhat negative evaluation, I decided to go ahead with my BabyExpress project. As it turned out, a design problem raised our expenditures beyond the realm of profitability. Demand for the product was high, but we ran into production difficulties, just as predicted. In hindsight, I know that if I'd listened to Business Insight, we might have saved the $1 million or so we put into BabyExpress.

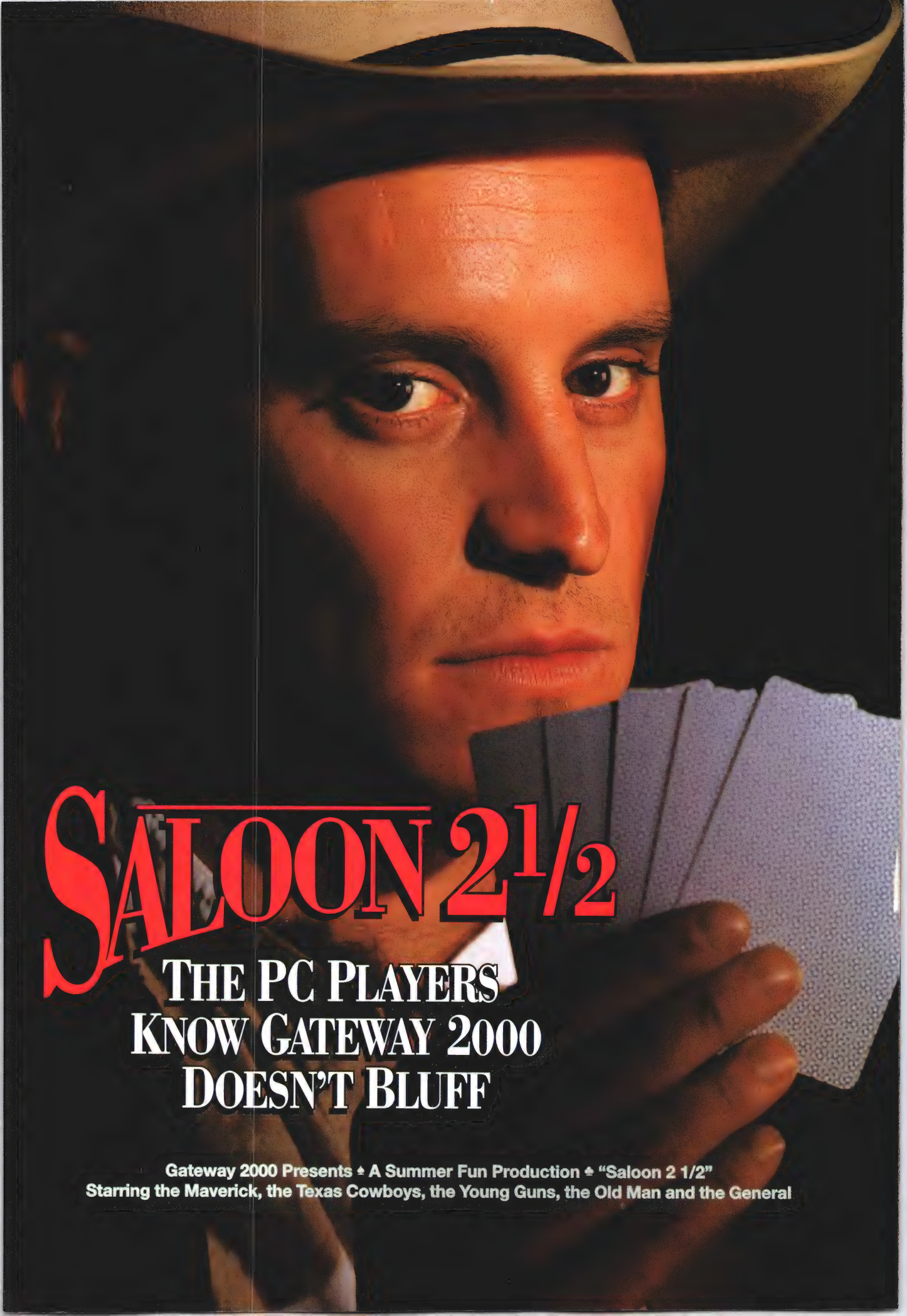
Though BabyExpress has not yet proved wildly successful, the software has—at least in my firm. Now, whenever new business possibilities come up, we run the proposal through the program. In one case, it saved us at least $150,000, and probably closer to a quarter million, by warning us away from what looked like a lucrative opportunity. We followed its advice and have since found that the move would have been only marginally profitable.

My staff uses the software to explore business potential in new markets and then presents detailed arguments and analyses to me. Even our accounting firm uses the software when it provides financial consulting. The software has also proved to be useful as a communications tool: When a group of us answers the questions by consensus, we are able to reach a comparatively fair and objective analysis without wasting a lot of time arguing.

Does all this mean that MBA-ware can actually take the place of a savvy consultant? Probably not. It does mean, however, that such software can be helpful. Because when it comes to business planning, there's no such thing as knowing too much.

Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources, we want to hear from you (see page 12 for contact information).*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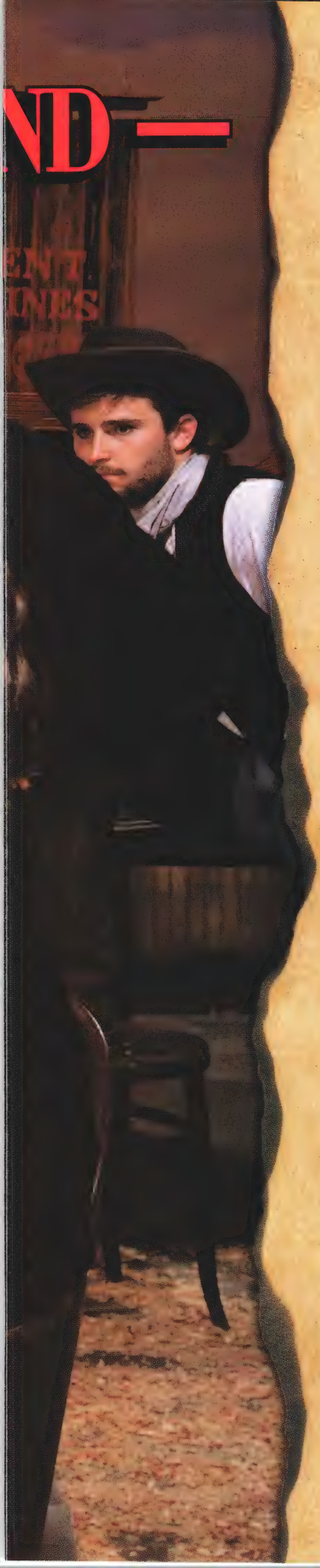

AND YOU'RE THE WINNER!

Hold on to your hat, pardner. Gateway 2000® is raisin' the stakes again! Now a double-speed CD-ROM drive is standard on every Gateway desktop PC, *and* every desktop system comes with a three-year limited parts warranty — *including* Gateway monitors! It's one of the strongest warranties in the industry!

On top of that, many Gateway desktops now include Microsoft® Office Pro™ with all of Microsoft's most popular business applications: Word, Excel, PowerPoint,® Access™ and Office Manager. It's powerful software to suit powerful systems. When you bet on Gateway, you're the winner with a hand that is unbeatable in the industry.

Speaking of the PC industry, if you've been hangin' around the PC Saloon for long, you'll recognize that this Gateway ad is a sequel to one that ran way back in the summer of 1990. Taking our cue from Hollywood, we reckoned if "Saloon" was a good ad, we might as well do "Saloon 2 1/2." What was surprising about lookin' back was seeing how many things have stayed the same.

The players around the industry poker table have changed some, but the game hasn't. Gateway's strategy is to deal you a royal flush of value: high-performance, high-quality PCs at the very best prices with old-fashioned, good service. Same as always. And although Gateway has become a Fortune 500 firm, we still think like a small, maverick company from the South Dakota frontier.

Yesirree, when you have a hankerin' for a PC, just holler. We'll give you the best deal in all the land.

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HAS AN UNBEATABLE HA

WHEN GATEWAY 2000 DEALS,

PENTIUMS™ ARE STRAIGHT ACES

Gateway 2000® Pentium-based systems are the best cards you can hold in terms of price and performance. Starting at only $2,499, they're some of the fastest PCs in the west, hands down. In a price-performance showdown with other CPUs, the 90MHz Pentium outguns them all. You just can't find more horsepower for the money.

Based on the Intel® Pentium processor, all P5 models include a PCI local bus and an enhanced PCI/IDE controller allowing your hard drive to transfer data up to twice as fast as non-enhanced systems.

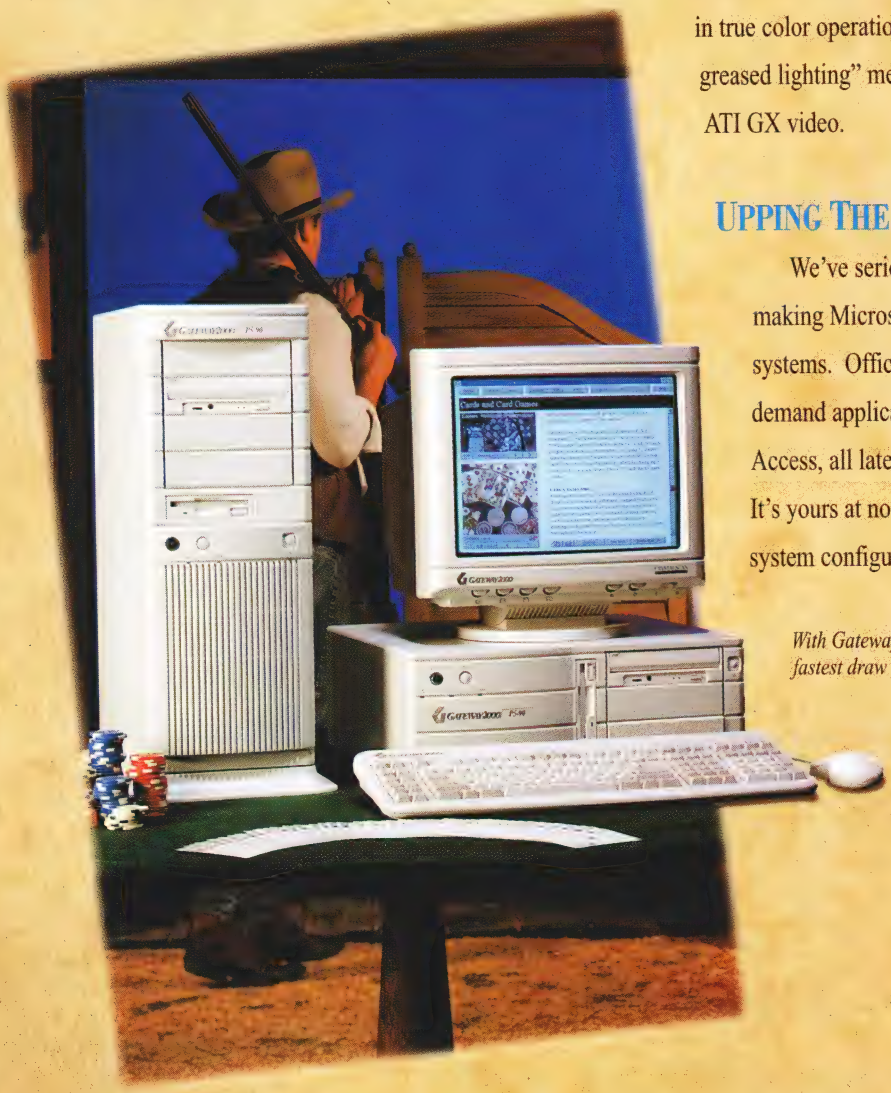
Gateway's ace of spades is the P5-90 Tower model, which includes most everything a PC-poke dreams of, for $3,999. (In the 1990 "Saloon" ad, our most advanced system was a 25MHz 486 with 4MB RAM and a 150MB hard drive for $5,295!)

QUICK DRAW

New this month, the P5-90 Tower has an ATI GX video card for a lightning-fast draw. The ATI GX video card uses the Mach 64 graphics accelerator — one of the first and fastest 64-bit accelerators on the market — and delivers over *100 million Winmarks* of video performance in Winbench 3.11 tests. This graphics accelerator is *twice as fast* as other 64-bit accelerators in true color operation. You'll understand what "faster than greased lighting" means when you try the P5-90 Tower with ATI GX video.

UPPING THE SOFTWARE ANTE

We've seriously upped the ante in the industry by making Microsoft Office Pro standard on most of our systems. Office Pro includes Microsoft's most in-demand applications: Word, Excel, PowerPoint and Access, all latest versions, with a retail value of $899. It's yours at no additional charge when you choose a system configuration with Office Pro standard.



With Gateway 2000's Pentium-based systems, you can be the fastest draw in the West ... or anywhere!

intel inside®
pentium PROCESSOR

YOU DRAW POWER CARDS

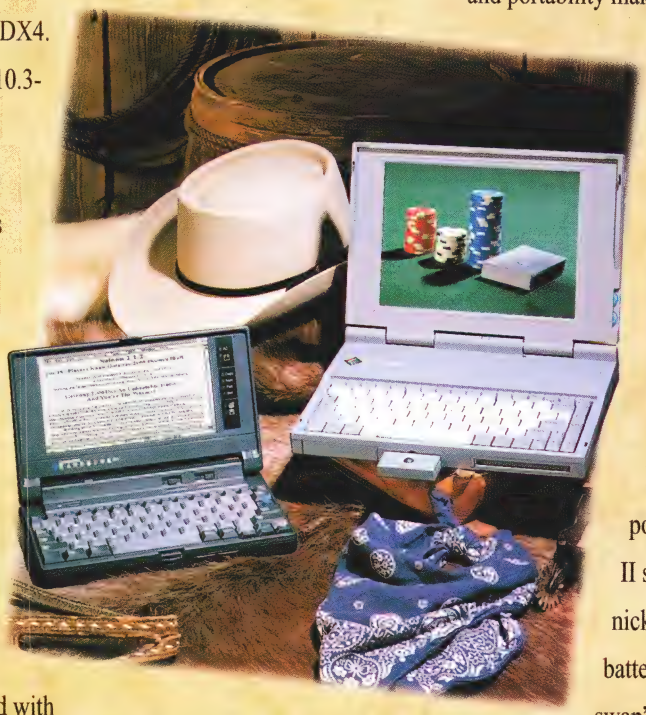
A PAIR OF PORTABLES

GATEWAY2000 COLORBOOK

If you know when to hold 'em, you'll hang onto the ColorBook™ from Gateway 2000. It's a rare card in the portable game that gives you outstanding color and desktop performance at a monochrome portable price.

The ColorBook comes in four 486 models, including the latest 75MHz DX4. Three ColorBook models include a 10.3-inch dual-scan screen, which is the biggest color portable display on the market. You won't find a screen this big, this affordable, anywhere else.

Weighing less than 5.7 pounds, the ColorBook is one of the thinnest color portables around. The ColorBook comes with a powerful Intel SL Enhanced processor — 486SX, DX2 or DX4 — and gives you 256 brilliant colors in VGA mode. These ColorBooks are packed with great features, and you'll love the extras we've added standard to all our models.



GATEWAY2000 HANDBOOK 486

The wild card in our hand is the HandBook® 486. And now Gateway has rustled up the **50MHz DX2** HandBook. Based on Intel's SL Enhanced energy-efficient processor, it's the fastest subnotebook in the West! The 50MHz DX2 is the new trump card in subnotebooks boasting 8MB of RAM, a whopping 250MB hard drive and MS Office Pro. In addition, you'll draw a full hand of features now standard on all HandBook 486 models.

You get an external diskette drive, a PCMCIA fax/modem, two batteries and a dandy leather carrying case — all included. Once you get your hands on a HandBook, you never want to put it down!

The HandBook 486 is the lightest Intel-based 486 portable available today. It weighs less than three pounds and measures roughly 10 x 6 inches. The HandBook's power and portability make it the perfect traveling companion.

It has a bright, backlit VGA screen and a comfortable, touch-type keyboard. You'll also like the HandBook's EZ Point™ integrated pointer, PCMCIA Type II slot, and long-lasting nickel metal hydride battery. You can "hot swap" with the HandBook, too — change batteries or peripherals while the PC is running without rebooting the system or losing any data.

Deal yourself a great hand with the HandBook 486 or the ColorBook from Gateway 2000.

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BLAZING FAMILY VALUES

FRONTIER FAMILY PC

With a Gateway 2000® Family PC,™ you and your family can explore the frontier of the wild west, or just about any subject, from the comfort of your home.

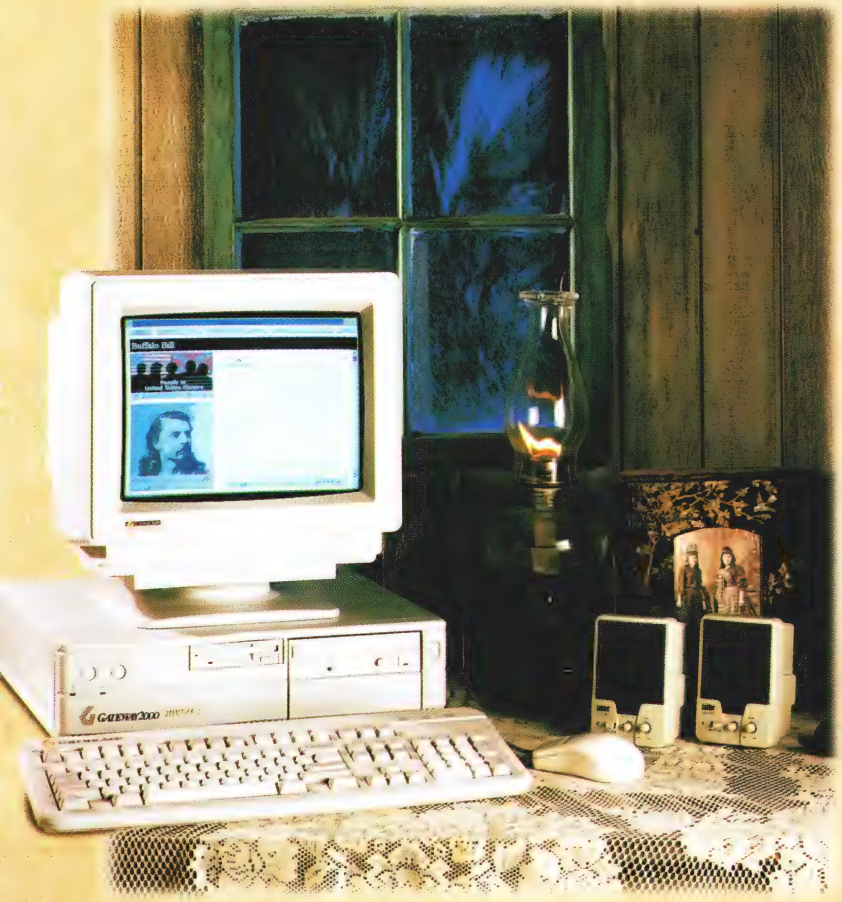
The Family PC is a fully equipped multimedia system including a fast CD-ROM drive so you can run the best programs and games with sound, pictures, animation and video. With its high-quality sound card and speakers, the Family PC lets you play music CDs with great stereo sound. The sound card also lets you hear audio clips or record audio.

You get a fax/modem with the Family PC, too, and all the communication software you need to connect with other computer users all over the world. With your modem, you can tie into computer bulletin boards such as CompuServe,® Prodigy,® America Online® and Internet where you'll find forums and information by the gigabyte.

The Family PC also includes great software. You get five outstanding Microsoft titles, plus the Corel Photo CD which is standard on all Gateway desktop systems:

- ♥ Microsoft Works,™ Multimedia Edition — gives you a word processor, spreadsheet, database and much more!
- ♠ Microsoft Encarta 1994 Multimedia Encyclopedia — includes the complete text of the 29-volume Funk & Wagnall's New Encyclopedia, and much, much more!
- ♦ Microsoft Baseball — new this month, Baseball is a sure hit with everyone.
- ♣ Microsoft Money™ — the complete personal financial management package.
- ♥ Microsoft Golf — terrific entertainment for the whole family!
- ♠ Corel Professional Photos CD Sampler — gives you tools to view Photo CD images.

Nobody in the industry deals you a software hand as strong as this one!



Gateway 2000's Family PC includes everything you need for multimedia and communication uses.

GATEWAY2000 FamilyPC

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STRONGER PRODUCT SUPPORT

WANTED: 3-YEAR WARRANTY

You asked for it. You got it. Now Gateway's high-quality desktop systems come with one of the strongest warranties in the industry. All Gateway 2000 desktop PCs are backed by a three-year limited warranty on parts. This includes *Gateway monitors*, an unusual provision in the industry, giving you one of the best support deals around.

Our portables still come with a standard one-year limited warranty on both parts and labor, or you can get our special VIP warranty. The VIP warranty, which gives you a replacement unit within 24 hours, is available only at the time of purchase for an additional $100.

For details on our new warranty and all of our service and support policies, please call or write for a free written copy.

MORE STANDARD SERVICES

As a Gateway customer you also receive a 30-day money-back guarantee and toll-free technical support. Our systems are covered by a one-year limited on-site warrarty. On-site service is available in most U.S. locations, and may be provided without charge during the warranty, if our technicians determine it is necessary.

A Gateway BBS membership also comes with every system. With the purchase of a modem, you get Triton's CoSession™ Host at no additional charge. This remote diagnostics software enables Gateway technicians to remotely work on your PC, with your permission, over the telephone.

PAYMENT OPTIONS

Gateway accepts most major credit cards and C.O.D. terms, with net 30-day terms and leasing options available to qualified commercial customers. You can also apply for the Gateway 2000 DuoLine™ MasterCard® Card, issued by Dial National Bank, Des Moines, Iowa.

ACROSS THE BORDERS

Gateway 2000 also makes it easy for friends in Canada and Puerto Rico to buy Gateway systems with toll-free telephone service to both countries. See the back pages of this ad for special 800 numbers. Plus, Canadian and Puerto Rican customers get award-winning technical support and CSA approvals. On-site service is available in some Canadian and Puerto Rican locations, and our international shipping rates are among the most competitive in the industry. Give us a call!

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- Mini Desktop Case
- 5 16-Bit ISA Slots
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Basic Audio Multimedia Kit

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- Gateway 2000 16-bit CD-quality sound card, compatible with Sound Blaster™ cards, with MIDI/game port, mic in, stereo line in/out
- 2 Labtec® CS-180 speakers
- Corel Professional Photos CD Sampler

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- New Altec Lansing ACS-31 three-piece speaker system
- MidiSoft Sound Explorer and Time Warner's Aegis software
- Corel Professional Photos CD Sampler

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Altec Lansing ACS-31 Speakers

A Gateway exclusive from Altec Lansing: a three-piece speaker set at a two-piece price. Two 3-inch free-standing speakers crank out up to five watts per channel while the subwoofer can deliver 15 watts of heart-pounding bass. **$119**

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- Ethernet adapter. **$149**
- Token Ring adapter. **$449**
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Critic's Choice: From Quicken to Calendars

I know you're out there, because I hear from you all the time—people who think software critics live the life of a Silicon Valley Hugh Hefner; so many toys, so little time. These are the same people who, when you tell them you travel 100,000 miles a year on business, think you must love seeing so many new, exotic places—like City of Industry, California, and Sioux Falls, South Dakota.

Getting free goodies can make a person cynical, but the truth is I actually buy a fair amount of computer stuff, especially products that make my life so much easier I just can't live without them. I get all the free hardware and software the FedEx drivers can carry, but here's what I actually *pay* for because it makes me more productive.

• **Quicken.** This is the program that changed my life most. It's a model for user-friendly software, taking a familiar object—the checkbook—and expanding it into a personal finance planning tool. Quicken tells me not only where I've been, but also where I'm going.

Is Quicken merely software, or a cult devoted to the worship of checkbooks that balance to the penny? Does it matter? That's what the devoted Quicken user says, and we dutifully order Quicken checks, Quicken deposit slips, Quicken envelopes, Quicken rubber stamps, and are right now filling out applications for Quicken credit cards. I'm pretty willing to buy anything Intuit wants to sell me. It's all great stuff.

• **Label printers.** I have two, one from Seiko and another from CoStar, both deluxe models. I bought them for the people who work with me, and if we ever work together I'll probably buy one for you, too. Being able to print a single label—for a carton or envelope—without a lot of hassle is a productivity builder. And a bonus, though its benefits are probably more imagined than real, is the ability to bar code ZIP codes on outgoing letters.

The poor person's version is a package of Avery's half-sheet labels, great for doing just the number of labels you need for disks or file folders. A friend has a new Brother P-Touch labeler that attaches to a PC and has software for making attractive labels. Looks great, but I haven't had time to buy one.

• **CardScan.** I've been collecting business cards by the hundreds, always meaning to enter them into a database. No more! Now I use Corex's CardScan, $395, to enter them automagically. Well, almost automagically—for a slow typist like me. The first time I used the scanner and got a stack of cards under control, the resulting contact database generated several times what the scanner cost, in new sales of my newsletter.

• **PaperMax.** The other scanner I use, PaperMax from Visioneer, $499, comes with software that lets me scan documents without giving it a second thought. Feed a letter- or legal-size document into this little scanner, and up pops the scanning software. Converting the scanned image into text is a drag-and-drop maneuver. When PaperMax handles business cards better and gains gray-scale resolution, then I'll have a scanner that really does it all.

• **Calendar Creator Plus.** I used to admire those monthly calendars that desktop publishing people create, complete with boxed events running along the bottom of several days. Actually making such a calendar, I found, required the patience of Job and a schedule that didn't change often. That was before I found SoftKey's Calendar Creator Plus, $79.95, which offers different formats and makes it easy to enter and change data. Now everyone I work with gets a monthly calendar showing my travel days, birthdays, holidays, paydays, and, most important, deadlines.

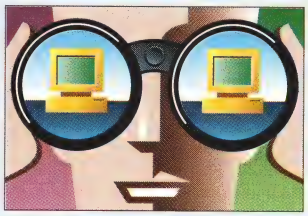
That's my little list of simple tools. They make me especially glad personal computers were invented.

Contributing Editor David Coursey edits P.C. Letter. *He can be reached on PC World Online (see page 12 for contact information).*

By David Coursey

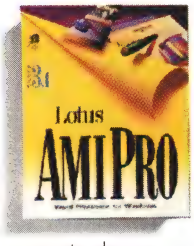
MICHELE CLEMENT

LOOKING AHEAD



I've looked at many mobile products, but most don't measure up. One that might is MobileWare, a collection of software that loads on a Novell NetWare server and provides E-mail, remote printing, remote faxing, and pager and cellular phone support to mobile PC users. The $279-per-user software also works across local area networks and can page or call the user when new messages are received. MobileWare Corp. of Dallas at 214/952-1200...Expect to find infrared communications for linking your portable PC to your desktop soon. After lots of noise, PC makers say they will really start using it in 1995...Watch Borland this fall or winter for a cool communications package, of all things...Keep an eye on Traveling Software, which is about to introduce its next-generation mobile software—look for remote access...There's a new version (2.0) of the Coactive Connector by Coactive Computing Corp. of Belmont, California, at 415/802-1080. At $149 each or $229 for two, this product is the best way I know to connect a half-dozen PCs (and Macs) for file and printer sharing.

It's been the same for centuries. The more important the document, the more people get involved. And that means more ideas. More points of view. More chance for confusion.



Introducing Ami Pro 3.1

You expect your word processor to be easy to use, powerful and flexible. But now you have the right to expect more. Lotus® Ami Pro® is the best word processor for workgroups and the only word processor that's truly integrated with Lotus Notes,® the industry leading groupware.

Ami Pro's Notes integration includes Notes/FX™ 1.1 technology for seamless data sharing between Notes and Ami Pro. Plus a built-in Notes database for efficient, secure, document sharing and tracking. Together with Ami Pro's built-in workgroup tools like Revision Marking and "Stick-it" Notes, a group of people can work together

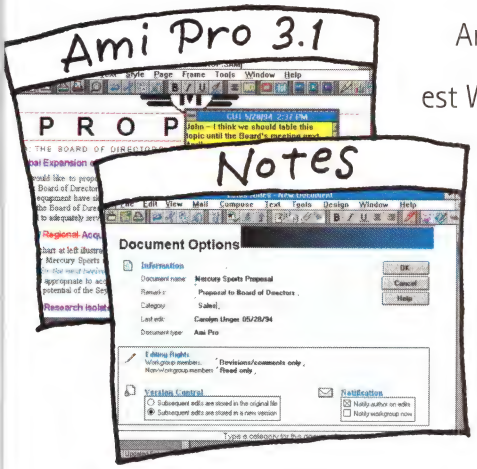
NOTES READY™

*NSTL Software Digest Ratings Report, Advanced Word Processors for Windows, 2/94. **$299 promotional price available while supplies last. †In Canada, call **1-800-GO-LOTUS**. ©1994 Lotus is a trademark of Lotus Development Corporation.

They obviously had a good workgroup.

Of course with the new Ami Pro and Notes they could have avoided all those amendments.

on the same document and arrive at a single vision.



Notes handles the routing, version control and security of your Ami Pro document as each member of your workgroup adds their comments.

Ami Pro is the fastest Windows™ word processor.* And Ami Pro's low memory/hard disk requirements – just 4MB RAM, 19MB for complete installation – make it the obvious choice for mobile professionals. And if you use cc:Mail, Notes or other VIM or MAPI compatible e-mail, you can format your messages with Ami Pro's powerful graphics and text styling capabilities to make all your communications look their best.

Check it out: Ami Pro is part of SmartSuite,® the

award-winning suite of applications from Lotus, and SmartSuite is just $299.** Call us at **1-800-TRADE-UP, ext. 9888**† or visit your Authorized Lotus Reseller.

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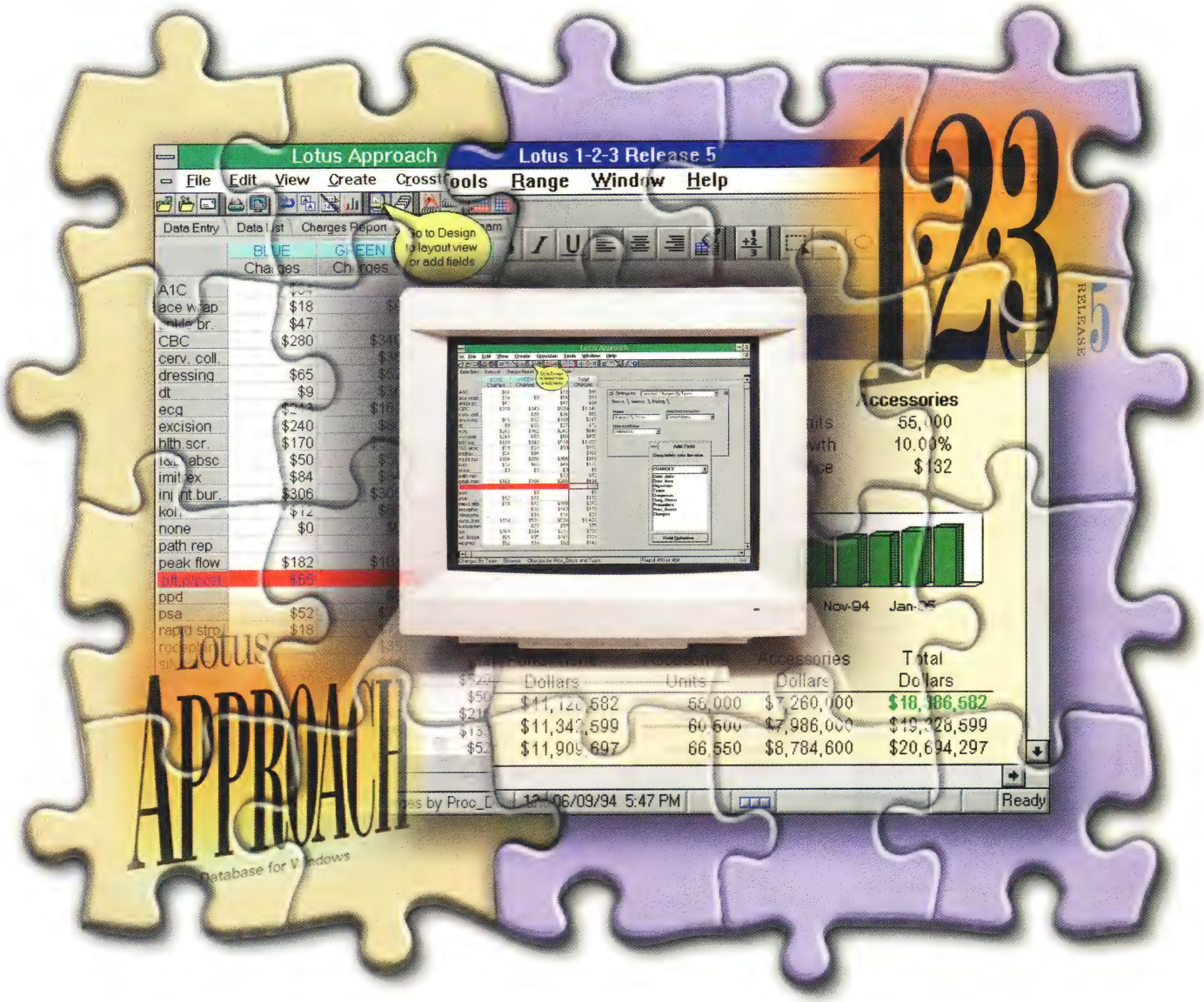
A Fresh Approach to SPREADSHEETS



Edited by Russell Glitman

TEST DRIVE

It's a fact of life: People store data in spreadsheets, and they'd like the features of a database manager to organize it. Instead of building that power directly into the next version of 1-2-3 for Windows, Lotus assigned those tasks to the new version of Approach, 3.0, which uses OLE to exchange worksheet data with the new version of 1-2-3, release 5.0, and its predecessor, 4.01.

Approach is great! This database management program has prebuilt database templates, Assistants that guide you through routine tasks, and a well-organized interface that's easy to navigate and customize. It works closely with 1-2-3 5.0 and 4.01, providing entry forms for spreadsheet data, crosstabs, and fancy reports. Enhanced multitable features and a (promised) performance boost make Approach the only easy-to-use database manager that's fully capable of managing real-life data. And it's priced to compete: $129, with upgrades from prior versions and Lotus SmartSuite for just $79.

1-2-3 release 5.0 for Windows gets an assist from Approach 3.0, with integration that makes data management and reporting easier.

There's not much new in release 5.0. It's essentially 4.01 with a smattering of newbies: a nifty mapping add-in, prebuilt templates to get novices up and running immediately, some random interface and file-handling improvements, and, most significant of all from the corporate perspective, tighter integration with E-mail systems and Lotus Notes. The release is now OLE 1.0 compliant and supports some limited OLE 2.0 features like drag-and-drop between sheets.

1-2-3 Data Management: Integrating Approach

"The best thing about this new release [of 1-2-3] is the integration between it and Approach: It makes 1-2-3 more flexible, and with that flexibility you can do a lot of shortcuts," says beta user Stacy Myers, staff environmental analyst with the South Florida Water Management District in West Palm Beach, Florida.

I agree with Myers, though it's too bad Lotus couldn't have given us the functionality of Approach in 1-2-3 so we don't need to spend money on two applications to perform pretty much what Microsoft Excel does all by itself. On the other hand, Approach 3.0's benefits are backward compatible with some earlier 1-2-3 versions—it works with release 4.01 as well as 5.0. While you'll get the same database access from either version, Lotus officials say release 5.0 will perform faster.

The integration with Approach is particularly useful for controlling data entry into spreadsheets. Via OLE, 1-2-3 can send spreadsheet data to Approach, where it appears in a default entry form. You can filter the records, add and delete records, and so on. Approach sends the data back to your worksheet. You can also use Approach's validation tools and lookup features on your spreadsheet data. For instance, you could join your 1-2-3 range to a DBF file, and validate your spreadsheet cell entries based on the values in the external file. If you're looking to delegate routine spreadsheet data entry to clerical staff, you will appreciate the control that Approach offers.

Approach also provides good-looking reports, including mailing labels, and it makes generating subtotals easy. However, you have to launch a separate program and use the Clipboard to paste results back into 1-2-3—not as handy or as flexible as Excel's subtotal and outline features.

The weakest aspect of the Approach integra-

News Monitor

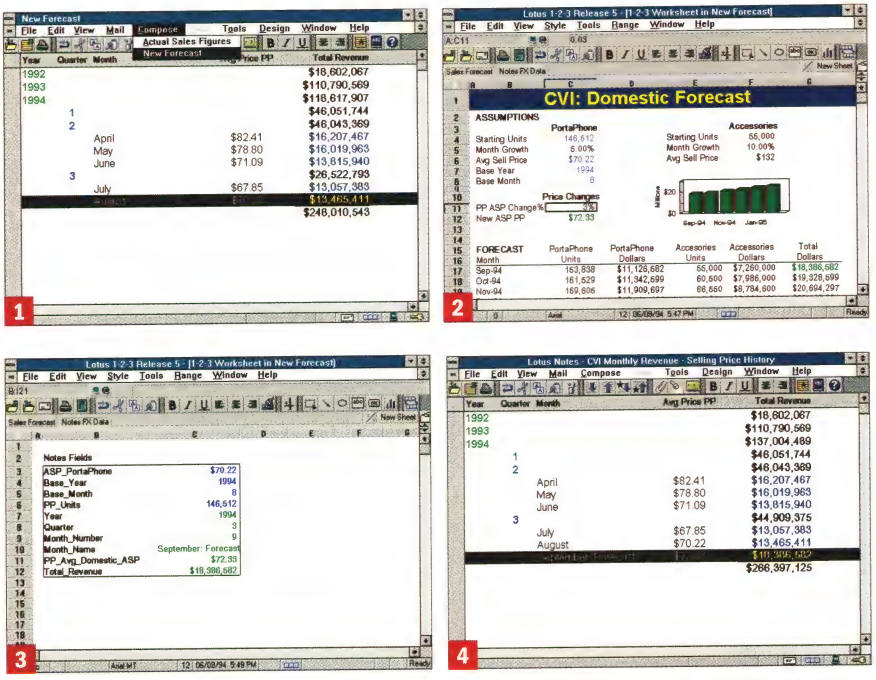
NEW WORLD ORDER: Compaq surpassed IBM and Apple in personal computer sales in the first quarter of 1994, according to the research firm Dataquest. "Compaq took advantage of Apple's PowerPC transition and IBM's traditionally slow first quarter...but we expect it to be a close three-way race by year-end," says Dataquest analyst Philippe de Marcillac. Compaq's shipment of 487,948 units was a 55 percent gain over the same period in 1993. The PC market grew 17 percent, but overall the industry showed consolidation, with declines in shipments by companies that were not among the top ten. At the end of the first quarter, the top ten, in order of units shipped, were Compaq, Apple, IBM, Packard Bell, Gateway 2000, Dell, AST Research, ZDS, Hewlett-Packard, and Toshiba.

CHEAPER, EASIER CD ROM: A new type of inexpensive, easy-to-install CD ROM drive has hit the market. The new drive connects to a PC via an IDE interface instead of the SCSI or proprietary interfaces used on current products. To install, simply plug the CD ROM drive into the IDE cable that connects most PCs' hard drives. Unlike existing drives, these units don't require a troublesome add-in card.

The first IDE CD ROM drives will be internal, double-speed models aimed at the low end of the market. List prices should range from $189 to $299, which compare favorably with list prices of $188 for the least expen-

(continued on page 65)

ILLUSTRATIONS: LEFT, JEFF BERLIN; ABOVE, BRIAN CRONIN



1-2-3 RELEASE 5.0 USES FIELD EXCHANGE (NOTES/FX 1.1) TO COLLABORATE WITH NOTES: (1) A Notes user adds data to the company sales application, which in turn launches 1-2-3, opens a template (2), and inserts the Notes data into certain cells (blue values). (3) The user adds additional data, which feeds formulas in the /FX range. (4) The green values are used to update the Notes database so that the information can be shared across the corporation.

tion is the Dynamic Crosstab feature, which tallies and summarizes categorical data. It operates much like Excel's Pivot Tables, but it's not as useful because Approach's crosstabs are less flexible.

Lotus claims that Approach is the easiest full-fledged database manager for end users—and it is. The late beta of release 3.0 that I used is both easier and more powerful than 2.1. Spreadsheet-style page tabs present views—forms, reports, lists, charts, and so on—as sheets in a notebook, just like 1-2-3's. Assistants, similar to 1-2-3's but even better, lead you step by step through routine procedures. There are 52 prebuilt database templates to help you jump-start your own projects: You get a contact list, inventories, a video library, even a wine list (but, alas, no Little League roster, which was my last Approach project).

Superslick Forms

The form designer makes data entry forms superslick. It provides a full set of drawing tools and a nifty tabbed dialog box that remains on screen and lets you change the properties of fields, drawn objects, text, headings, and so on. Right-clicking on most objects calls up a context-sensitive menu.

The report generator is no longer band-oriented; instead it lets you edit your report as you view your data. You can sort, group, and subtotal data by clicking on the tool bar. Creating mailing labels is a snap, since Approach already knows the product numbers of the Avery labels you're probably using.

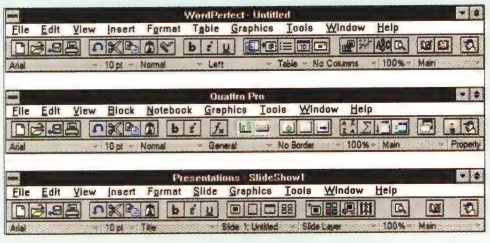
Approach's seeming simplicity belies its sophistication. The program supports the ODBC database standard and back-end processing of SQL queries, and it now handles more complex relational designs. The upshot: Approach lets you set up a basic relational data entry system (for example, including contacts and companies) quicker than any other popular spreadsheet.

The Perfect Office?

Fresh from its merger with networking giant Novell, WordPerfect Corporation is busy developing its replacement for Borland Office, the now-defunct business suite that included both WordPerfect and Borland applications. Scheduled to ship this fall, PerfectOffice will offer five tightly integrated business applications: WordPerfect, Quattro Pro, InfoCentral, Inspire, and Symmetry. While WordPerfect and Quattro Pro (which Novell acquired from Borland) are familiar to most PC users, the other products may not be. InfoCentral is WordPerfect's new personal information manager, Inspire is an updated version of WordPerfect Presentations, and Symmetry is the renamed WordPerfect Office, the company's E-mail, scheduling, and groupware app.

According to WordPerfect officials, the new PerfectOffice apps will share a common look and feel, with Windows interfaces that feature similar icons and menu choices. Except for Symmetry, the programs will also be OLE 2.0 compliant and will share some code; as a result, each will perform faster and require less RAM and hard disk space, the company claims.

WordPerfect also plans to distribute PerfectOffice on CD ROM, which will include additional work-group, consumer, and third-party software in a try-and-buy program that lets users purchase the software (at extra cost) and unlock it by calling an 800 number. Another high-end version, PerfectOffice Professional, will include Borland's Paradox database and Visual App Builder. PerfectOffice's pricing should be competitive with that of Microsoft Office. WordPerfect Corp., 800/321-4566. Reader service no. 695



DEJA VU: PerfectOffice, due out this fall, will feature a common look and feel among its applications.

The integration between 1-2-3 and Notes is what makes this spreadsheet great, says beta user Stacy Myers.

1-2-3 5.0: Plus Ça Change...

While the changes to Lotus's flagship spreadsheet fall far short of the challenge set by Excel 5.0, SmartMaster templates provide 13 macro-driven worksheets ready to go. 1-2-3 now lets you drag and drop cells and objects between files. The SmartFill feature, which automatically fills in a range with a sequence of values, no longer requires a trip to the tool bar: Just drag the edge of the cell. In the formatting arena, you can set the color of the sheet tabs, and a FastFormatting tool copies fonts, colors, and so on from one area to another. Pop-up "bubble help" balloons (also in Approach) tell you what the tool bar buttons mean.

Corporate users will appreciate release 5.0's E-mail enhancements and links to Notes and Notes/FX 1.1 (Field Exchange). The new range-routing feature lets users send a portion of a spreadsheet to others via E-mail; the recipient opens it as a self-contained file, fills in data, then routes it back to the sender, where it rejoins the original worksheet as a Version Manager version. Notes/FX provides a nonprogramming way of routing templates and data values between a Notes database and 1-2-3.

However, the late beta version I saw did not satisfy much on the release 4.0 user's wish list. For instance, you can't drag sheet tabs to rearrange the pages of a file as you can in Excel, and there's still no obvious way to select a given page quickly in a file with many worksheets. You can't copy and paste into a collection of cells, and there are still no custom number formats available. The wish list goes on.

1-2-3 Maps: Are We There Yet?

Enter a list of states, along with your company's production figures, then select Tools•Map. A new add-in generates a map that color-codes your production status in up to six levels. Release 5.0 ships with about ten maps, including ones of Europe, Mexico, and the world. These are not mere drawings—they're geographically aware: For example, if you overlay the U.S. map on the Canada map, each appears in the correct position. By the same token, you can pinpoint the latitude and longitude of any spot on a map, then use those values to place a marker at that position. The maps are provided by Strategic Mapping, which sells additional maps and demographic data.

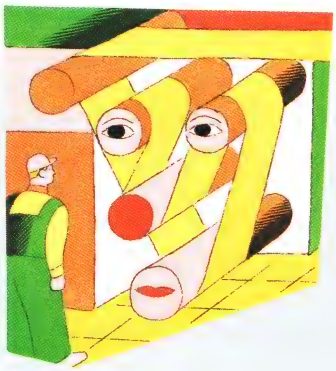
Purchasing Decisions

If you're shopping for an end-user database manager, then Approach is a must-buy. And if you're an Approach 2.1 user, the upgrade is well worth it. However, if you're thinking about upgrading from 1-2-3 4.01 to release 5.0 and you don't really need the mapping feature or Notes/FX 1.1, you might want to sit this one out—you'll be able to take advantage of Approach 3.0's features with your existing version.

—Richard Scoville

1-2-3 release 5.0 for Windows and Approach 3.0

Key Features: 1-2-3 5.0: SmartMaster templates • Maps • Approach data entry forms and reports • Field exchange with Lotus Notes/FX 1.1
Approach 3.0: SmartMaster templates • Easier interface • Enhanced relational capability • Improved performance
Pricing: 1-2-3 5.0 $495, upgrade $129; Approach 3.0 $129 through December 31 ($495 thereafter), upgrade $79
Availability: Immediate
Lotus Development Corp., 800/343-5414
Reader service no. 693



News Monitor

(continued from page 63)

sive drives with proprietary interfaces and $400 for typical SCSI models (including adapter cards).

Wearnes Technology is shipping the double-speed CDD-120 drive at a list price of $189. In late June, ALR plans to ship its first CD ROM drive, the double-speed ALR Express CDE-1200, for $299 list. In August, Aztech Labs plans to ship the double-speed CDA 268-031; no price was available at press time.

"BIGGER" CD ROM: Today's CD ROMs hold up to 660MB of information, but thanks to a new data storage technology, vendors will soon be packing one-and-a-half to ten times that amount of data onto one disk. The new technology, called capaCD, increases disk capacity by creating an additional "virtual" layer of storage in the CD ROM and implementing a new data compression scheme called Multipress. Disks that use the capaCD storage technology will work in today's CD ROM drives, and you won't have to buy any special software or hardware to use them, says Ed Brakus, CEO of EWB and Associates, the firm that developed capaCD. According to Brakus, there is no performance compromise with capaCD.

IBM TO MAKE PENTIUM-CLASS CPU: NexGen's Nx586 processor, a RISC chip that the company claims matches Intel's Pentium in performance and compatibility, will be manufactured by

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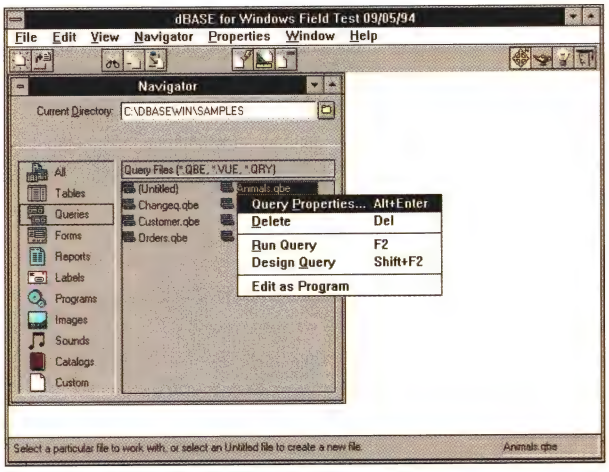
PHOTO: SHAW MCKUTCHEN; ILLUSTRATION: BRIAN CRONIN

dBASE for Windows: Worth the Wait



THE DBASE NAVIGATOR replaces the Control Center; it lists files by type. Right-click to show a SpeedMenu of actions.

TEST DRIVE Borland's dBASE 5.0 for Windows has been a long time coming—three years—but it looks like the wait was worthwhile. With the exception of a relatively small group of commands, the program provides compatibility with its DOS ancestors—dBASE III Plus and dBASE IV—while giving dBASE users a Windows interface replete with new tools that will enhance homegrown corporate dBASE applications.

Navigator Replaces Control Center

The first thing you notice about the new dBASE is how much it resembles Borland's other Windows programs. You get a SpeedBar, SpeedMenus, Object Inspectors, tabbed dialog boxes, and the new Navigator—all designed to let you point-and-click your way through database tasks instead of poking through menus or tapping in commands at the infamous dBASE dot prompt. In case the new interface is totally unfamiliar, the menus show their commands' corresponding hot keys; as your cursor moves over an icon, a brief description of it appears at the bottom of the dBASE window.

The Navigator, which replaces the dBASE IV Control Center, provides easy access to your files by offering a customizable list of files by type (such as All, Forms, Table, Queries, and Programs) in a particular directory or in dBASE IV–style catalogs. Double-clicking on any file listed in the Navigator opens the file. But what really makes the Navigator a treat to use are dBASE for Windows' SpeedMenus, borrowed from Borland's Paradox for Windows. Just right-click almost any object in dBASE for Windows, and up pops a SpeedMenu of context-sensitive actions you can perform with that object. In the Navigator, this means you can right-click on a file name and select from a menu of choices, such as Run or Design, that show what you can do with the file.

Two-Way Tools and the Command Window

I always thought of dBASE as a program for application developers, but it seems that plenty of end users utilize dBASE to manage their own database projects. Both users and developers will be pleased with the new Two-Way Tools, Borland's name for the tools that let you build table browsers, forms, queries, and menus. When you use one of these tools to create an object, dBASE writes code that you can then modify directly instead of using the design tool.

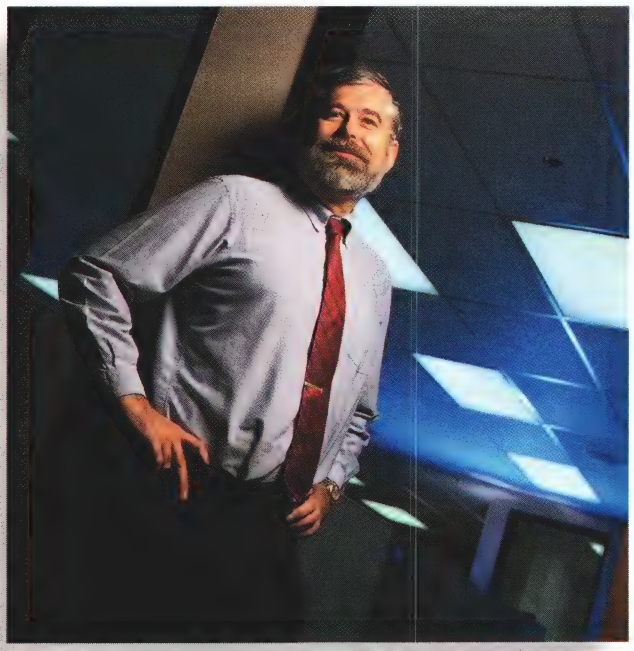
If you've stuck with dBASE for DOS while Windows opened all around you, chances are you're familiar with the dot prompt. In a bow to the loyal installed base, Borland has integrated its new visual design tools with dBASE's traditional command-line orientation to create the Command Window. As you work in dBASE for Windows, the commands that dBASE generates as you use the SpeedMenus or other tools appear in the Command Window. You can edit these commands and execute them again, or simply type commands directly into the window.

When you create a new form in dBASE for Windows, you can do it one of two ways: You can start with a blank window or use the Form Expert to get help in designing your layout. If you use the Expert, dBASE asks you a few questions and creates a form based on your responses. You can add your

What's Inside dBASE 5.0 for Windows

New feature	Function
Navigator	Lists files by type; you can run a file or perform other tasks
SpeedBar	Lets you click icons to execute common dBASE commands
SpeedMenus	Context-sensitive menus
Object Inspectors	Lets you change an object's properties without programming
Two-Way Tools	Visual design tools that generate dBASE code
New field types	OLE and Binary
Form Expert	Designs a form based on information you provide
Form Designer	Lets you design forms and add objects like graphics and push buttons
Visual Query Designer	Window for creating queries, linking data files, and creating indexes
Crystal Reports for dBASE	WYSIWYG report writer
Windows API and DLL support	Supports Windows API, VBX controls, and calls to DLLs
Paradox access	Lets you create and access Paradox data files
SQL support	Lets you access Oracle, Sybase, InterBase, Informix, and DB2 data

own touches to the form after the Expert does its work. When you design a form yourself, you see two windows—a Form Designer and a Control Palette. The Control Palette is a menu of objects you can include in your design: text boxes, data entry fields, push buttons, lines, graphics, scroll bars, and so on.



"A first-class Windows development system," says dBASE beta tester Terry Martin, IS director at Asyst Technologies.

The Form Expert lets you choose from a variety of layouts, including one called One to Many that allows you to show a group of records at the same time. This option is intended to make it easy to create forms that show information from related files—say, one file of order information and another file of the line items for each order. I couldn't get this feature to work in my preproduction version, but if it did, the One to Many feature alone would make dBASE for Windows worthwhile to me.

Visual Query Designer

dBASE for Windows' Visual Query Designer lets you set up queries with a minimum of typing; in addition, you can click to select fields or tables. A SpeedBar icon opens a Define Link dialog box, where you click a field in one file and a matching index for the related file to link them together. This dialog box also has a nice option that allows you to create an index on the spot.

Crystal Reports

Instead of trying to build a better mousetrap (or report writer, in this case), Borland chose to incorporate Crystal Reports for dBASE into dBASE for Windows. This seems like an excellent move to me, especially after seeing how easy it is to create reports containing data from multiple files: You just design a query that shows how you want your files related and then use the resulting data as the basis of a report. I was able to include calculated and summary fields in a report with almost no effort and without having to refer to the documentation or online help. Having struggled to get the results I wanted from other report writers that were not nearly as WYSIWYG as they claimed to be, I found this a refreshing experience.

The biggest challenge faced by the dBASE for Windows development team was to ensure that old dBASE programs would run within the new Windows interface. It looks like they've succeeded. You can "DO" most dBASE III Plus and dBASE IV programs from the Navigator without modification. A few old commands are not supported in the Windows version, but the list is short, and you can check it easily in the online help.

Developers have a grab bag of new features to select from, thanks to extensions to the dBASE programming language. "The additional opportunities for dBASE developers are mind-boggling in terms of controls and the interface," says Terry Martin, director of information systems for Asyst Technologies in Milpitas, California. Developers can now use object orientation in their programs. So instead of writing procedure-

News Monitor

(continued from page 65)

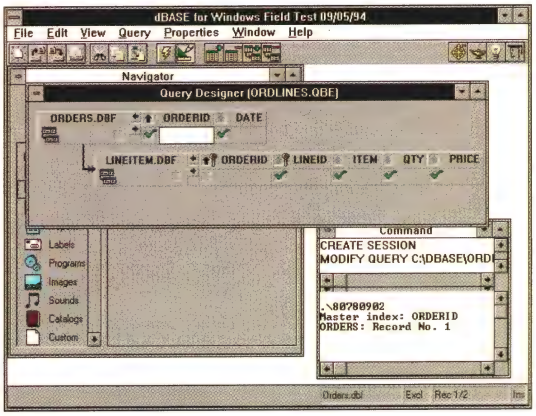
IBM. NexGen plans to have 100,000 chips manufactured within the first year of production. Without a manufacturing partner, it's unlikely that NexGen, based in Milpitas, California, could make enough chips to compete effectively with Intel's Pentium line.

Tangent Computer is expected to be among the first to offer a NexGen system. According to Tangent's director of sales and marketing, Mike Zabaneh, the performance of the 60-MHz Nx586 rivals that of Intel's 60-MHz Pentium. (NexGen will also offer a 66-MHz Nx586.) The Nx586 doesn't come with a math coprocessor—most business applications don't require one—but NexGen will sell a math chip, the Nx587, as an option.

APPLE GETS NO BITES: Though the Macintosh operating system has won acclaim for its ease of use and appeal to computer users, Apple Computer is finding the technology a hard sell to PC vendors. Apple recently announced plans to license the Mac OS to all takers—a break from tradition, designed to broaden Apple's market share. But so far, not even a nibble. According to *Software Industry Bulletin* editor Jeff Silverstein, the top-tier PC vendors are "extremely wary" of going Mac. "They're all so heavily dependent on Windows, and they don't want to ruffle Microsoft's feathers," he says.

Edited by Randy Ross
Contributors: Joe Abernathy, Jeff Bertolucci, and Laurianne McLaughlin

PHOTO: ROBERT HOLMGREN; ILLUSTRATION: BRIAN CRONIN



THE VISUAL QUERY DESIGNER SPEEDS UP query design with point-and-click tools for selecting fields and tables.

oriented programs that use menus to lead users through various tasks, developers can attach code to objects such as push buttons or other controls in a form. For example, a user could click the mouse to print a report instead of having to meander through menu trees. I tried this feature and found it was pretty simple to add a button to a form, attach some familiar dBASE code, and end up with a mouseable custom control button.

dBASE for Windows also supports the Windows API and calls to DLLs written in other programming languages. This expands the possibilities for dBASE apps since developers are not limited to functions provided by dBASE itself. And with the addition of an OLE field type and the OLE Viewer, developers can now store objects from Windows applications in a dBASE table and launch the owner program with a double-click. A new field type for binary objects can also be used to hold the files for objects, such as sound, that programs called from dBASE can manipulate.

Expanded Data Access

While there are two new field types, OLE and Binary, the data file format for dBASE for Windows is nearly the same as dBASE IV's—the only significant difference in the Windows version is that you can create and use Paradox tables. Paradox data files offer many more field types and more flexibility in naming fields (allowing spaces and longer names). But you have to use Paradox itself to add features such as validity checks and referential integrity (which protects the values used to link related tables).

dBASE for Windows has also turned dBASE into an effective desktop tool for accessing data on a variety of SQL servers; it supports Sybase, InterBase, Informix, Oracle, and (soon) DB2. When you connect to one of these servers and open a SQL database from dBASE for Windows, you can work with the data just as if it were stored in a dBASE file. And you don't have to know SQL commands—the program translates your dBASE commands into SQL automatically.

Overall, dBASE for Windows is a great product, particularly for those who have been waiting to carry their dBASE DOS applications into the Windows environment. For developers who are committed to dBASE, this program should be a hit.

—Celeste Robinson

dBASE 5.0 for Windows

Easier to use and better to develop with, this is the best dBASE ever.

Key Features: Navigator • SpeedBar • SpeedMenus • Object Inspectors • Visual Query Designer • Form Expert • Form Designer • Object-oriented language extensions

Pricing: $495.95, user upgrade $199.95

Availability: Immediate

Borland Int'l, 800/331-0877 ext. 1212

Reader service no. 694

Compaq Turns to AMD for Latest PCs:

Analysts expect two new entries in Compaq's consumer-oriented Presario line to beat competitors' prices by as much as $100, using an AM486SX2-66 CPU that AMD currently makes just for Compaq.

The Advanced Micro Devices chip forgoes the math coprocessor built into comparable 486DX CPUs from Intel, as well as clones from Cyrix and AMD. This lets Compaq lower prices while adding premium features suited to typical home use, such as the 14.4-kbps fax-modem built into its Presario CDS 860 model.

The CDS 860 also includes a 340MB hard drive, 8MB of RAM (expandable to 64MB), a double-speed CD ROM drive, a 3½-inch floppy drive, a Sound Blaster–compatible 16-bit sound card, external speakers, and a microphone. It offers snappy local bus graphics with 1MB of video RAM, a Compaq mouse, a Pentium upgrade socket, and compatibility with the forthcoming Plug and Play standard. Bundled software includes MS-DOS, Microsoft Windows, Compaq's TabWorks, Microsoft Works, Intuit's Quicken, and trial subscriptions to America Online, CompuServe, and Prodigy. On CD ROM, you get Microsoft's Encarta encyclopedia and Multimedia Works for Windows, as well as the Mayo Clinic Family Health Book.

The system should sell for a street price just under $2000.

The Presario 660 includes a 340MB hard drive, a 2400/9600-bps fax-modem, 4MB of RAM (expandable to 56MB), local bus graphics with 1MB of video RAM, a 3½-inch floppy drive, a Compaq mouse, and the same software as the CDS 860, minus the CD ROM titles. The 660 should have a street price of about $1399.

Both the CDS 860 and the 660 include Compaq's popular hardware-software combo of a telephone answering machine and voice mail, data, and fax capabilities. Monitors are sold separately. Compaq Computer Corp., 800/345-1518. Reader service no. 695

JOHN GREENLEIGH

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PC WORLD — June 1994, May 1994

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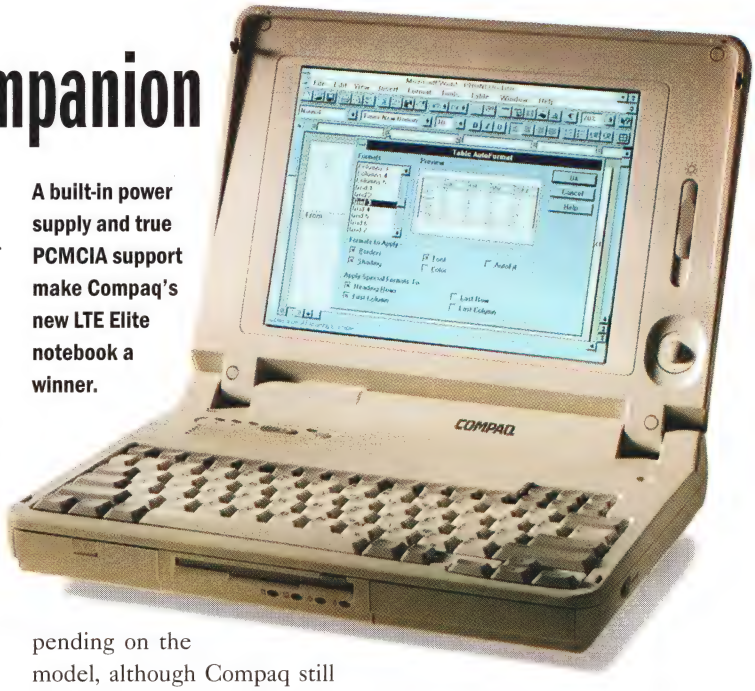

A built-in power supply and true PCMCIA support make Compaq's new LTE Elite notebook a winner.

TEST DRIVE ▶ Fond memories, a feeling of surprise and delight, are what I associate with my first Compaq notebook, which I received from my employer at the time, the *Houston Chronicle*. I could hardly see the screen, the hard drive was too small to handle the basic communications and word processing software, and the battery life was measured in minutes. But it was heaven, because I had been using a Radio Shack Portabubble—and if you don't know what that is, trust me: It's bad.

That magic returned recently when I fired up the new Compaq LTE Elite. Pushing beyond the basic requirements of mobile computing—good performance, superior screen quality, low weight, and substantial battery life—the Elite features a desktop expansion chassis, upgradable components, and (finally) true support for PCMCIA that includes auto-configuration and hot-swapping.

The five new Elite models, which replace the popular LTE Lites, offer crisp performance, with processors ranging from the 486DX2-40 to the 486DX4-75. Prices range from $3299 to $6499—on the high end of the notebook pricing scale, but about what you'd pay for a Toshiba or an IBM notebook. The display options include a dual-scan passive color screen, an 8.4-inch or 9.5-inch active-matrix color screen, or Compaq's exclusive 9.5-inch black-and-white active-matrix display.

The Elite models come with 170MB, 250MB, 340MB, or 510MB hard drives. The standard 8MB of RAM is upgradable to 20MB or 24MB, depending on the model, although Compaq still requires proprietary RAM modules for its machines.

The Elite notebooks and the SmartStation docking unit are all compatible with the forthcoming Plug and Play standard, and each system includes an updatable flash BIOS. Compaq's auto-configuration of PCMCIA expansion cards is the best Plug and Play support for mobile computing I've seen. It was a joy to actually swap cards in and out of an Elite and have everything continue to work as promised. The Elites accept two PCMCIA Type I or II devices, or one Type III device.

Other innovations include a built-in power supply, a fan that activates when you recharge, and a 2-ounce power cord. The Elite I tested (with an active-matrix color screen) weighed 6.8 pounds, which seems heavy until compared with the 8.3-pound Toshiba T4700CS or 8.2-pound IBM ThinkPad 750C.

I've carried eight notebooks in the past four years (three of them Compaqs), and the Elites move the mobile computing standard forward.

—Joe Abernathy

Compaq LTE Elite

Key Features: Upgradability • Good performance • Desktop docking station • Excellent graphics • Best PCMCIA implementation going

Pricing: $3299 to $6499

Availability: Immediate

Compaq Computer Corp., 800/345-1518

Reader service no. 690

S Is for Super and Small:

Call the Versa S small, says NEC, but don't call it a subnote. This new Versa packs a 9.5-inch screen (significantly bigger than the 7.8-inch color screens you find on subnotebooks such as the Compaq Aero and Toshiba Portégé) and a keyboard that's almost full-size. The Versa S weighs in at 5 pounds with an active-matrix screen, 4.7 pounds with a dual-scan screen, and 4.2 pounds with a monochrome screen. The dual-scan measures 10.8 by 8.3 by 1.5 inches (other models vary slightly).

Estimated street pricing for the 33-MHz model is under $2000 with a monochrome screen, less than $2500 with dual-scan, and around $3400 for active-matrix. The 50-MHz model comes with an active-matrix screen, and it will sell for less than $4000, according to the company.

The Versa S includes 4MB of RAM (upgradable to 12MB) and a 210MB or 260MB hard drive. NEC reduced the weight by making the half-pound floppy drive external, and the unit uses a pointing device much like the TrackPoint on IBM's ThinkPad notebooks. A PCMCIA slot holds one Type III or two Type II cards.

NEC claims that the active-matrix model will operate for 2 to 4 hours on a single battery charge, the dual-scan model for 2.5 to 4.5 hours, and the monochrome for 3 to 5 hours. The Versa S uses a nickel-metal-hydride battery and boasts a small AC adapter that measures 5 by 2.5 by 1 inches. NEC America, 800/632-4636. Reader service no. 691

JOHN GREENLEIGH

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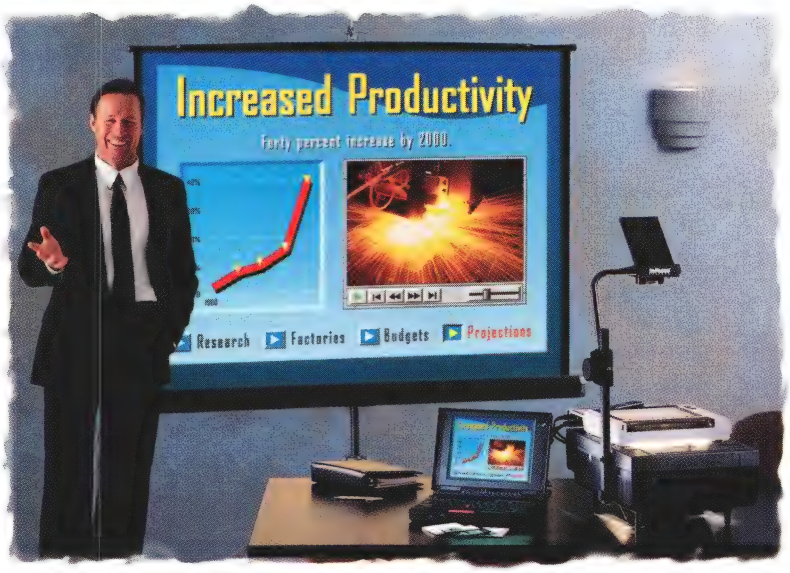

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This Is Not Your Father's OS/2

TEST DRIVE If Microsoft doesn't make it, I don't need to run it. Windows runs, mostly. Change operating systems? Why bother?

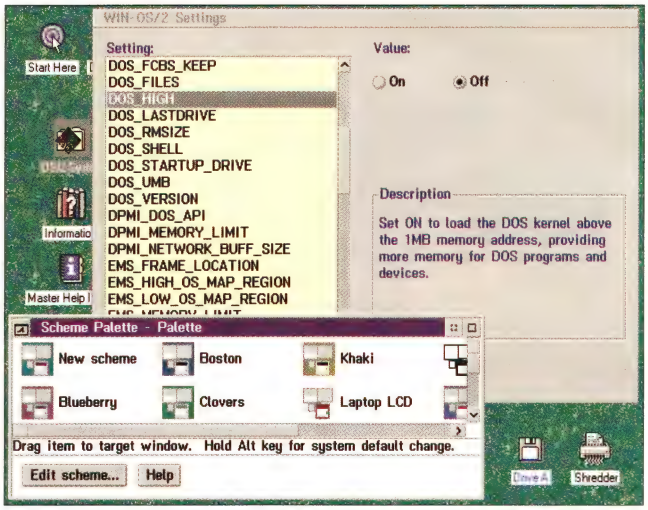
Sure, I checked out OS/2 2.1, but it was slow, ugly—and different. Yes, it's technologically superior to Windows, but do I need that technology, along with its high overhead in system resources and poor performance? Preemptive multitasking is fine, but I have enough trouble running one program at a time, let alone multiple applications. Virtual DOS machines and crash protection sound good, but if I need a copy of Windows running for every app I want protected, no thanks.

Meeting the Challenge

Give me these benefits without the high overhead. Do something about performance. Make that homely Workplace Shell an object of beauty.

Those are the challenges IBM confronted with the latest revision of its 32-bit operating system. The results are surprising. The release I reviewed, OS/2 Performance Beta 1, delivers snappy performance on an old 33-MHz 486DX PC with just 4MB of RAM, and includes a host of features designed to broaden its appeal to the consumer and mobile markets. The product was due to go into a second beta version in July, with final release slated for fall as an upgrade to OS/2 for Windows—the version of OS/2 that ships without Windows and is designed to optimize installed versions of Microsoft's operating system. The upgrade will likely be renamed Personal OS/2.

Hot performance is the key feature of this release, but several more merit mention. In what may be a first, IBM made concessions to appearance in designing the Workplace Shell, with new 3-D icons and drag-and-drop color palette schemes for the desktop. It may sound picky, but some jazzy pastels and a nice bit-map backdrop make OS/2 a lot more attractive—especially when displayed beside a Windows NT machine and another running Intel's NextStep. *Those* people know the value of good looks.



A WIDE ARRAY of environment variables can be set for each program object or class of objects in OS/2's object-oriented environment.

Object-Oriented OS/2

Beneath the improved exterior lies the greatest appeal of the new OS/2: an object-oriented architecture. To get used to the idea, imagine the document templates found in most word processors, give them intelligence, and extend the approach to the whole computing environment. Word processing objects open inside a word processor when you launch them, communications objects open in Crosstalk, Internet objects open in Chameleon, and so on.

For mobile users there's a particularly nice benefit to IBM's object-oriented approach: The computer can auto-sense PCMCIA devices. These credit card–size devices are a nightmare to deal with under normal circumstances, but they work marvelously in OS/2's object-oriented environment. OS/2 now treats PCMCIA cards as objects and assigns each a particular behavior. For instance, if I send a fax from my laptop and the PCMCIA fax-modem is not present, the outgoing letter will queue up until I insert the modem, then route itself automatically. This is a good beginning, but if IBM really wants to hit a home run, it will study Compaq's software implementation of Plug and Play, which is both auto-sensing and auto-configuring—you'll never have to

Comparison Shopping: What's in the Operating Systems

● Yes ○ No	MS-DOS	Windows 3.11	Windows NT 3.5	Windows 4.0	OS/2
Preemptive multitasking	○	○	●	●	●
Multithreading	○	○	●	●	●
Advanced memory management	○	○	●	●	●
Object orientation	○	○	○	●	●
Long file names	○	○	●	●	●
High-performance file system	○	○	●	○	●
Networking	○	○	●	●	add-on
Symmetric multiprocessing	○	○	●	○	add-on
CPUs supported	Intel x86	Intel x86	Intel x86, DEC Alpha, MIPS, PowerPC, HP RISC	Intel x86	Intel x86; PowerPC planned
RAM required	640K	4MB	12MB	4MB	4MB
Target systems	PCs	PCs	workstations, servers	PCs	PCs, workstations, servers

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– Windows Magazine, January 1994

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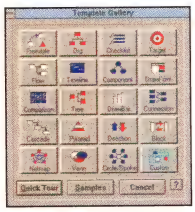

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Circle 183 on reader service card

Continued from page 72

set up your PCMCIA devices.

This systemwide object orientation also helped IBM improve OS/2's versatility. Right-click any program object, and you get a list of dozens of environment and operating system attributes you can modify for just the right performance. Do you have a DOS program that needs only a CGA screen? Click here, and you suddenly have 710K of conventional DOS memory available in that window. <Ctrl>–right-click and drag on that window, and you've created a custom DOS window object that will always have those settings.

Faster Than Ever

OS/2 also runs noticeably faster than its predecessor: According to IBM benchmarks, users can expect up to a 100 percent improvement. Windows users can opt for a hot-load feature that loads Windows when OS/2 boots. And you can now run Windows programs in separate, protected virtual DOS machines with only 700K of overhead for each copy of Windows, improving crash protection.

Two more features may endear you to the new OS/2, though they weren't ready in the beta I examined. The first is what IBM claims will be one-button installation. For me, however, the beta installation was an all-day affair, so we'll wait and see on that one. It should be working in Beta 2.

The other feature is what IBM calls an "information superhighway enhancement." I knew the phrase *information superhighway* had lost all meaning when I recently saw *USA Today* use it to describe a police database with no link to the outside world, so I checked with my sources at IBM to find out what they really meant. At the very least, you should see a better implementation of IBM's TCP/IP protocol suite, with an improved set of graphical clients for the typical Internet session—ftp, telnet, whois, news, mail, and so on—along with an implementation of the Mosaic multimedia front end to the World Wide Web. In addition, IBM is planning to package some Internet connectivity services to ease the process of finding and configuring a dial-up TCP/IP account, a process that, for the average businessperson, would be like this writer tackling calculus. The time frame for delivery of this TCP/IP connectivity had not yet been established at press time.

Still to be resolved is how Chicago—the future Windows 4.0—will run with OS/2. It is possible that it won't at all—at least not initially. Microsoft and IBM are no longer bound by technology-sharing agreements, so IBM may have to do some fast programming to get Chicago going under OS/2. On the other hand, it could be spring 1995 before that's an issue.

Should all of this convince you to reconsider OS/2? Absolutely. It's now my operating system of choice for the oldest, slowest machine in my office, and as time allows I plan to install it in a dual-boot configuration with the operating systems on my other machines. Nothing from Microsoft can compare to OS/2's maturity or scalability, going as it does from the most humble typing station to the notebook to the high end of the desktop.

—Joe Abernathy

Daytona: Turbocharged Windows for Power PCs

OS/2 isn't the only 32-bit operating system to meet the need for speed. The beta of Windows NT version 3.5 sizzles, if you have the hardware.

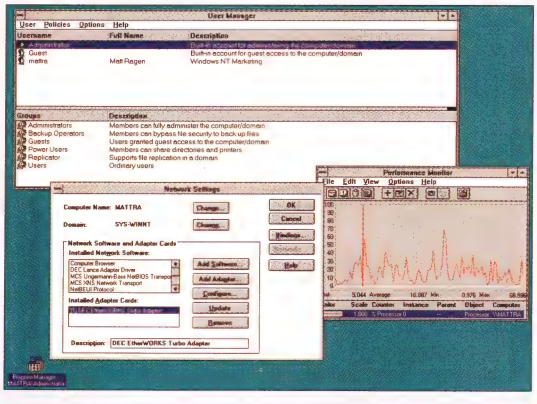
NT and OS/2 used to be positioned as competitors; the two have since moved in wildly different directions. Both are multithreaded operating systems that feature preemptive multitasking, but IBM recently succeeded in squeezing those features into 4MB of RAM, whereas the beta of Windows NT (code-named Daytona) needs a minimum 12MB of RAM.

Fearing, correctly, that consumers would stay away from NT in droves, Microsoft repositioned it as a high-end product for use in workstation environments, by which Microsoft means a machine with 16MB or more of RAM, a large hard drive, a very advanced graphics display, and the ability to interact with a TCP/IP network—and establish interactive Internet connections.

TCP/IP is a local and wide area networking standard born in the UNIX world that is now taking over many corporate environments. Improved TCP/IP is one of the touted benefits of NT 3.5, but *marginal* is how I'd describe my experience.

Having come from a Sun UNIX corporate background, and having used Chameleon TCP/IP for Windows every day for the past year, I expected to be able to get the protocols to run. When I couldn't, I called a friend who runs a UnixWare-based site on the Internet—no luck. I called the Windows NT TCP/IP product manager for Microsoft, and he couldn't get it to run. It would connect only with another Windows NT PC.

So while Microsoft reinvents the wheel—er, UNIX—one aspect where NT has succeeded is speed. NT 3.5 is *fast:* The multithreading lets you hit Print and be back to your writing before you can blink. It's a joy finally to have real multitasking in Windows. If you have a computer hot enough to handle it.



WINDOWS FOR WORKSTATIONS: The advanced networking features of NT will cost you at least 12MB of RAM.

Personal OS/2

Key Features: Auto-sensing for PCMCIA • Improved interface • Faster

Pricing: Not set at press time; street price under $150 expected

Availability: Fall

IBM
800/342-6672

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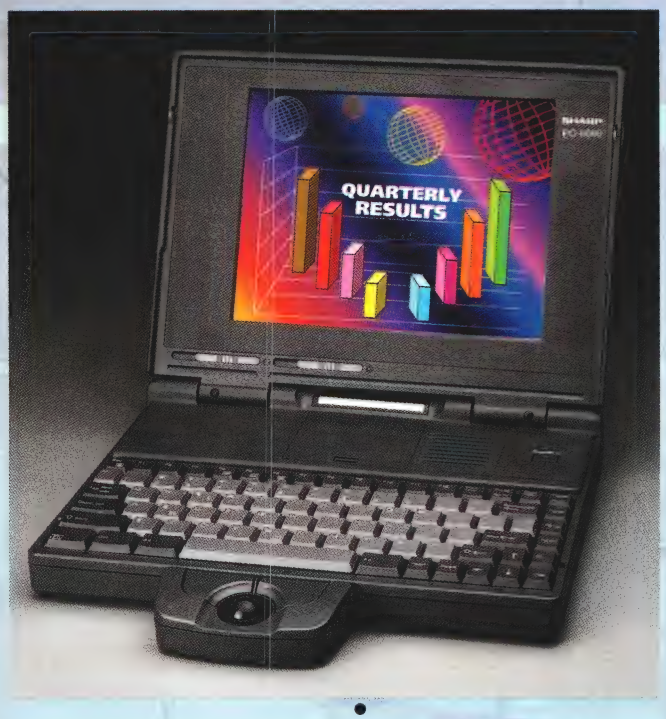
[Sharp PC-8660 *Active-Matrix* Notebook]



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Integrated, multiprotocal Boot-ROM	X		
ISA Plug-n-Play Compliant	X	X	
Multilevel Security Features	X	X	X
Asset tracking	X	X	
PC tattooing	X	X	
Optional Desktop Management Software	X		
Bi-directional parallel port	X	X	X
Desktop Management Interface (DMI)[3]	X		

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- *32-bit Fast-IDE local-bus hard disk interface*
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- *32-bit Fast-IDE local-bus hard disk interface*
- *8-MB RAM, expandable to 96-MB*

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— PC World: April 1994

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— PC Computing: January 1994

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Networking

A PC WORLD MONTHLY SECTION ON GETTING THE MOST FROM YOUR NETWORK

8 Tips to Make NetWare Work for You

Your NetWare network lets you share printers and other devices and communicate with your colleagues. Okay, you already know that. But maybe you don't know about all the things NetWare can do that will increase your productivity and save you serious hassles. Here are 8 ways to put your net to work for you.

1. Guard your privacy with a password.

NetWare's password system protects your network account from unauthorized use. If you don't use a password or you suspect someone else knows your password, establish a new one with NetWare's SETPASS command. At the command prompt, enter **SETPASS**; NetWare will prompt you for your old password and then ask twice for your new one. It's a good idea to change your password every few months. Want an automatic reminder to change your password? Ask your ever-busy network administrator to set an expiration date for your password. When you log in after your password has expired, NetWare will remind you to change it.

2. Log in from another PC.

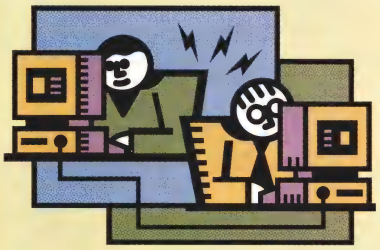
Passwords ensure that only authorized persons can access your company's files, but that doesn't mean you have to log in from your own PC. For example, if your office has only one PC set up with the modem or CD ROM you need, you can log in and work there. Your log-in program may run automatically when you boot up, or you may have to type in a command (such as **NET**) to run a batch program. This program probably runs two or more NetWare programs (called the communications protocols and shell programs) that connect you to the network, point to the drive and directory where the log-in program is, and ask you to enter your log-in name and password.

Before you log in from another PC, ask your network administrator if there are restrictions on concurrent connections. If not, then change to the network log-in directory and type **LOGIN** and your user name. If your systems administrator allows concurrent connections, you needn't log out from your own PC first.

If you're running back and forth between computers and need to see who is logged in at each, type **WHOAMI** at the command prompt. Whenever you log in from another location, it's a good idea to make sure Windows isn't running at that PC. There's a chance that executing NetWare commands while running Windows will crash your Windows session.

3. Log out, for safety's sake.

At the end of the day, exit your applications and log out from your PC, or any other PC you've been using, to make sure the network backup includes your files. (The backup program your network administrator runs each night may skip any open files.) Before you turn off your PC, type **LOGOUT** at the DOS prompt.



INSIDE NETWORKING

81 / Buying Tips: Making a Savvy Server Selection
Here's a quick guide to buying the right network server for your needs.

Contact *PC World Networking Edition* at 77 Franklin St., Boston, MA 02110; 617/482-8470, 617/426-0235 (fax); 71154,443 on CompuServe.

RIGHT: JAMES KRAUS; ABOVE: STUART BRADFORD

4. Save files on your network user directory.

You probably have a personal network directory, sometimes called a home directory, where you can save or back up your own files. If so, use it, and don't save files to any other network directory unless your network administrator instructs you to. If you get an error message while trying to save files to your personal directory, you may need more disk space. To check, enter **CHKDIR** when in the directory. If Space In Use equals the Maximum, ask the net administrator nicely for more disk space.

5. Track and manage your print jobs.

Have you been waiting interminably for a file to print, or are you just curious about the route your print jobs take after they leave your PC? First, find out which queue your print jobs wait in. If you're working in Windows, open Print Manager to see the queue name. If you're working in DOS and are logged in to the net, type **CAPTURE SHOW** and then **PCONSOLE** at the DOS prompt. Select *Print Queue Information* from the Available Options list. On the next screen, select your queue in the left-hand box, and choose *Current Print Job Entries* in the right-hand box to see a list of all print jobs. Select the job you want, and press **<Enter>** to see the status of the job.

6. Print files directly to a net printer.

If you need to print a text file quickly, use the NPRINT command to send that file directly to a network printer. For example, to print a file named README.TXT to a print queue named LASERQ on a server named ACCTING, type **NPRINT README.TXT ACCTING/LASERQ**.

7. Share documents and templates.

If certain documents, templates, or spreadsheet models are hot items in your department, store read-only originals in a shared directory on your network. For example, a file containing boilerplate text can be copied from a shared directory to a personal directory and then modified. Be sure to remove the read-only attribute before you work on your copy: The DOS command ATTRIB *filename.ext* -R should do it.

8. Avoid Windows hassles.

It's a good idea to log in to the network before you start Windows. Your log-in script assigns drive letters to server disk volumes, connects you to network printers, and otherwise creates your own personal network environment.

It's also a good idea to run NetWare utilities, such as Syscon, in a stand-alone DOS session. If you run the utilities in a Windows DOS session, you might get error messages such as 'Integrity Violation' when you return to Windows.

For the same reason, don't enter 'logout' in a DOS session while you're still running Windows. If Windows "hangs" when you run DOS utilities that continuously poll the network for information (for example, Pconsole's print queue job listing screen), your PC is not properly configured to run Windows and your network at the same time. Ask your net administrator to fix this.

—Andrea Powers and Bill Lawrence

Andrea Powers is an associate editor for PC World *in Boston. Bill Lawrence is part of a team that manages a 3000-workstation network for a major utility in California.*

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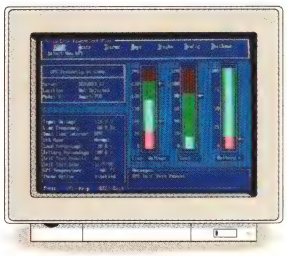

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Making a Savvy Net Server Selection

JEFF BERLIN

If the components of your network were a football team, the server would be the quarterback. Just as it's hard to field a winning team without a competent quarterback, it's hard for your network to perform well with an inadequate server. On the other hand, a great quarterback can cover for weaknesses at other positions, and a high-performance server can similarly compensate for deficiencies in other parts of your network.

Your server hardware choice has to make the grade on three fronts—performance, reliability, and expandability. The need for performance is obvious: Since many network users access the server at the same time, the server's ability to turn around requests quickly is vital to the overall efficiency of your network.

Reliability is also a critical requirement, since many network users depend on the server's availability to get their jobs done.

Expandability is all too easy to underestimate. A server that scales up gracefully to meet an increasing workload can save you work and money as your net grows.

Performance: A Multipart Equation

The server basically handles requests to retrieve or update files or shared database records. The incoming requests are received via the server's network card and processed by the server's CPU. Along the way, information is generally read from or written to the server's hard disk or disks, and the request is completed with an outgoing transmission to the requesting workstation via the server's network card.

Since the server CPU sets the pace for the speed at which requests are handled, it's a no-brainer that the CPU should be the fastest you can afford. Fortunately, Intel CPUs and their compatibles are quite affordable these days, so get a high-end 486 or (if you have the bucks) a Pentium.

Certain network operating systems, including Windows NT and some versions of UNIX, benefit from multiple processors, which means that your search will need to extend beyond the standard high-end PC-class server and into the more specialized multiprocessor server realm dominated by vendors such as Compaq and NetFrame as well as UNIX server vendors. Be prepared for sharply higher pricing here.

While a single large hard disk is cheaper, multiple smaller disks often perform significantly better on a server.

Since virtually every incoming server request entails either a read from or a write to the server's hard disks, optimizing hard disk performance is critical. Today it's difficult to buy a slow disk; access times are typically below 20 milliseconds.

Two common types of disk adapters are IDE and SCSI. IDE (for Integrated Drive Electronics) hard disks are inexpensive and widely used in desktop PCs, but most standard IDE drives can't support more than 528MB of storage, and the typical IDE adapter can't support more than two drives. However, a new Enhanced IDE specification for adapters should handle disks up to 8.4GB and as many as four devices—including CD ROM and tape drives. You'll pay a little less than a dollar per megabyte for higher-capacity standard IDE and Enhanced IDE drives.

SCSI (for Small Computer System Interface) drives and adapters cost a bit more but are worth the additional investment. SCSI offers excellent capacity (2GB, 3½-inch SCSI drives are commonly available) and more expandability (up to seven drives can be connected to the same adapter). Brand name, high-capacity SCSI disks cost slightly more than a dollar per megabyte if you shop shrewdly. SCSI optimizes performance on multiple disks by enabling each drive to read and write independently, while IDE drives support reading or writing to only one drive at a time. You also can connect other commonly shared SCSI storage devices, such as CD ROM and tape drives.

While a single large disk is cheaper, multiple smaller disks often perform better. NetWare and other network operating systems support a feature called *disk spanning*, in which a single logical disk volume encompasses multiple hard drives. The blocks that make up each file are evenly scattered among the disks, so an incoming request to retrieve a file results in multiple disks sharing the load and working concurrently to satisfy the request.

Dividing the workload among multiple network cards may also be a valid strategy. On busy networks with many users, forcing all server requests through a single network card can create a bottleneck. If your network is divided into multiple physical networks (or *segments*), you can probably improve performance by putting multiple network cards in the server, with each card connected to a separate segment. Since a

card typically costs less than $200, this can be a cheap performance boost.

Network requests and disk traffic flow inside the server via the server PC's bus, which itself can become a bottleneck. The average PC includes an ISA (Industry Standard Architecture) bus. This bus is limited to a 16-bit data path and achieves a maximum theoretical transfer rate of about 16MB per second, though in reality you'll usually get only a third of this rate. Bus alternatives that offer higher performance at a higher cost include EISA (Extended ISA) and MCA (Micro Channel architecture), both of which increase the data path to 32 bits and transfer information several times faster than an ISA bus. (MCA is an IBM bus design with less third-party support.)

To take full advantage of an EISA or MCA bus in the server PC, your network cards and disk controllers generally should support a feature called *bus mastering*, which enables the card to transmit data on the bus without waiting for the server CPU to handle the request.

A new bus standard called PCI (Peripheral Component Interconnect) promises to deliver much of the performance of EISA and MCA buses for less money. For now, PCI is used primarily as a local bus on workstations; but it's also gaining acceptance as a way to boost performance of network cards and disk controllers in servers.

Another important point you should consider when buying a server is memory. Networks use server memory as a highly intelligent disk buffer. Memory that is not in correct proportion to the disk space installed in the server PC could make your Pentium server seem as slow as an XT. Currently, 16MB of RAM costs about $800, but bear in mind that the price of memory is very volatile.

Like other high-performance PCs today, servers come with fast CPU cache memory as well. This buffer usually ranges from 32K to 256K—and, typically, bigger is better.

You can recover some of the cost of cranking up server performance on other fronts. If your server runs NetWare or a nongraphical flavor of UNIX, don't invest in a high-end video adapter, monitor, keyboard, or pointing device.

COMPAQ'S PROSIGNIA LINE is among a new generation of systems tailored for server requirements.

What to Look for in a Network Server

Recommended minimums for three classes of network servers:

INEXPENSIVE BUT FAST (up to 35 users)

- 50-MHz 486DX CPU
- ISA bus with PCI local bus
- 16MB RAM
- 500MB IDE hard disk
- IDE or Enhanced IDE disk adapter
- ISA bus network card
- Monochrome VGA
- Estimated cost: $2500

MIDRANGE (35 to 150 users)

- 100-MHz 486DX4 CPU
- EISA bus
- 32MB RAM
- 1GB SCSI hard disk
- EISA bus-mastering SCSI adapter
- EISA bus-mastering network card
- Estimated cost: $5500

SUPER SERVER (100 to 500 users)

- 100-MHz Pentium CPU
- EISA bus
- 64MB RAM with error correction
- 2.5GB RAID
- EISA bus-mastering SCSI adapter
- EISA bus-mastering network card
- Estimated cost: $17,000

Nonstop Service

When choosing a reliable server configuration, it's important to buy from a reputable manufacturer in order to make sure that you get consistent quality and reliability. A no-name server simply may not have the quality of design needed to withstand the stress of running a 32-bit network operating system under heavy-load conditions, and when a difficult problem arises (and count on it—it will), there may literally be no name for you to call to help you troubleshoot.

Most server failures occur in two areas: memory and hard disks. Memory errors are the most pernicious; they may manifest themselves as parity errors reported when you start the server PC, or they may just cause the server PC to crash mysteriously. Buying a quality server is good insurance against this type of failure. If your budget permits, invest in a super server that includes built-in memory-error correction.

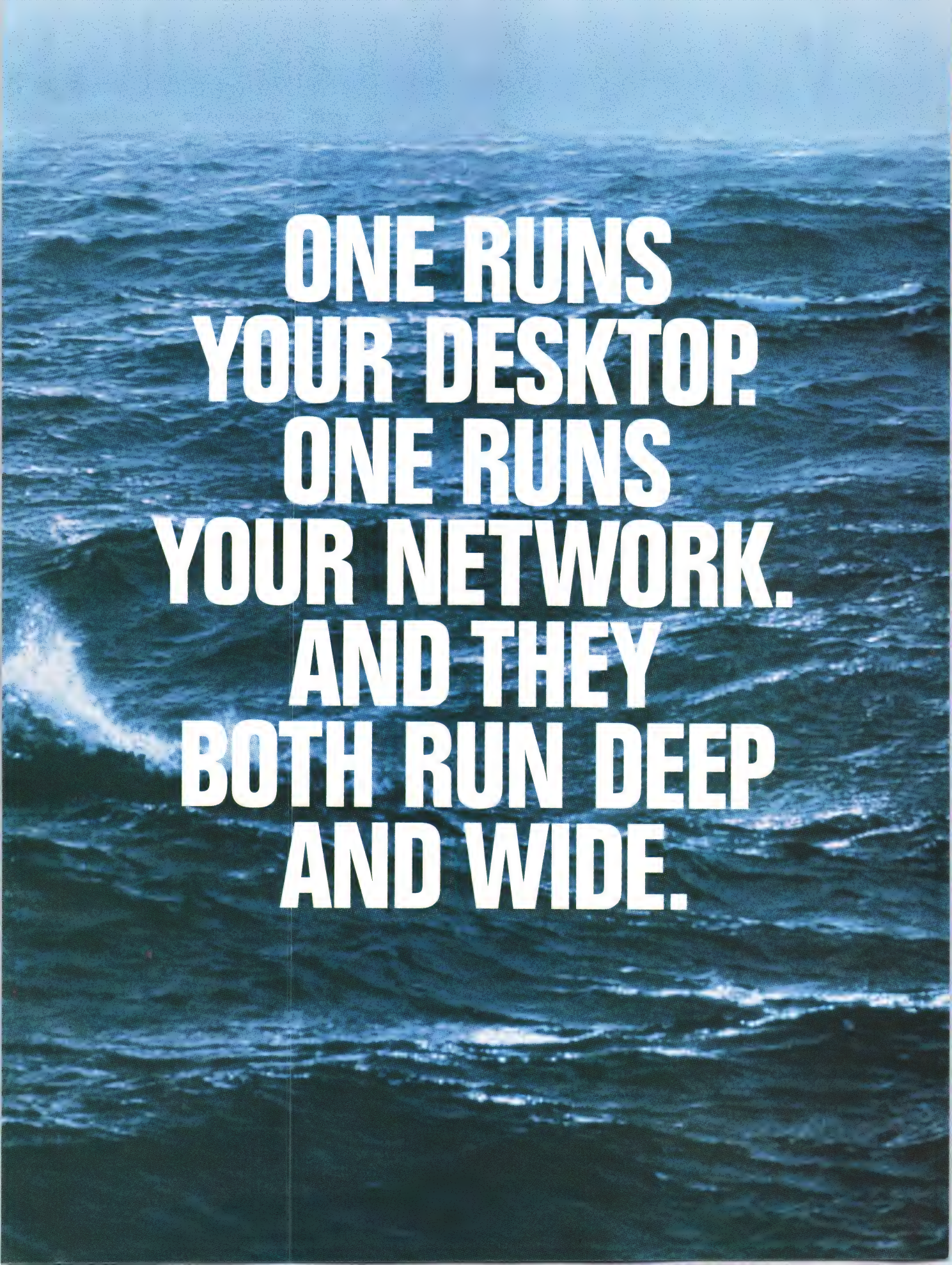
Since hard disks are mechanical devices with high-speed moving parts, the question is not *whether* one will fail but *when*. The best insurance against disk failure is *disk mirroring:* NetWare and other popular network operating systems let you pair two disks with one disk adapter, so that each disk in the pair duplicates the other's information; if one of the disks fails, its mirrored partner automatically takes over, with no interruption in server availability. Since disk mirroring requires that you double your disk space investment, it usually is implemented only for networks that absolutely must stay up and running.

An alternate technology, called RAID (Redundant Array of Inexpensive Disks), offers protection at a lower cost. A RAID configuration connects multiple disks, and the equivalent capacity of one disk is set aside to store failure-recovery information. When a disk fails, this data is used to calculate and supply the lost disk's information, again without interrupting the server's availability. If you have a RAID consisting of five disks, you have the equivalent capacity of four, and any disk can fail without stopping the server.

Even better, you can now purchase hot-swappable disks that can be replaced without stopping the server. Whenever a hot-swappable disk fails, you can unplug it and replace it without having to fiddle with the server's power switch. Naturally, you will have to pay a bit more money for this feature, since both the disk and the server disk cabinet have to be specially outfitted to accommodate it.

You should plan for growth from the beginning by choosing a server case that allows plenty of disk and memory expansion and packs a hefty power supply: 200 to 300 watts at a minimum. And make sure your server has enough expansion slots to accommodate future growth.

—Bill Lawrence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Your company is a kind of ecosystem. An intricate network of diverse types that all feed on information. Constantly.

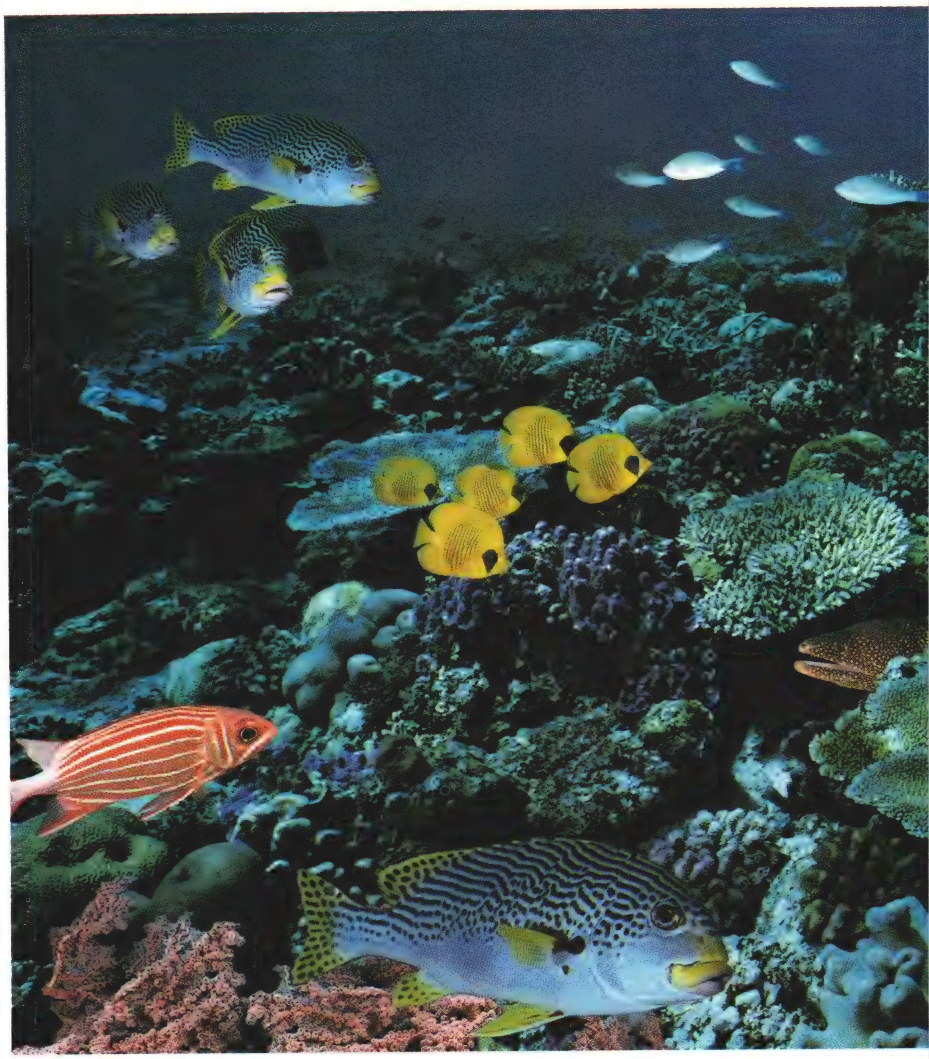
And, just as sophisticated systems in the ocean are built on a foundation of coral, your business needs a dependable platform, a solid infrastructure on which to sustain itself and cultivate growth.

The Microsoft® Windows NT™ Advanced Server is that foundation. The one complete network operating system that gives you the solution capabilities of a minicomputer with the speed and price of a file server. Nothing else can do all that.

The widest range of possibilities.

No other network operating system runs as many business programs or runs them as well. From accounting and payroll systems to customer tracking.

It supports and integrates a whole spectrum of server applications, networks and hardware. So you can find the answers to make better decisions. Faster. Through the familiar Windows™ environment.



Easy installation. Easy integration.

It's all in the box. A new standard of simplicity. Ready to set up and manage. Even with NetWare®, UNIX® and SNA systems. Because Windows NT Advanced Server integrates with all your networks that are already in place.

Naturally, integration means you've got central management from a single computer. Load balancing. Troubleshooting. The

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It can even accommodate Hewlett-Packard® OpenView,® IBM® NetView® 6000, and the Sun® Net Manager.® So you can manage the largest mixed networks there are.

You pick the hardware.

Choose the chips that deliver the best price/performance for you. Pentium,™ MIPS,® DEC® Alpha AXP.™ Single or multiprocessor.

And this robust platform is the essential long-term answer, too.

The microkernel architecture at the core of Windows NT Advanced Server means the solutions you develop today will last into the next century. Our object technology, built on this core, lets you leverage your current investments as you move to new distributed systems.

That's why thousands of companies have already used it to build rock-solid solutions for their organizations. Fact is, Windows NT Advanced Server has the highest customer satisfaction rating of any Microsoft product in history.

So call us at (800) 434-3982, Dept. NPK, and get your free evaluation kit. Or get Windows NT Advanced Server now and the next upgrade* is yours for free.

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I blew it...

The surge protector I've been using didn't have the *joules for the job.* They tried to tell me, the more joules your surge protector has the more protection you have!" But did I listen? I guess that's obvious! And did the surge protector come with a *connected equipment warranty?* Ask my checkbook.

Curtis Surge Protectors offer the highest joule rating today in their class. The higher the joule rating, the more energy the surge protector can absorb.

Curtis also backs the surge protector's performance by covering the equipment that is plugged into it. So don't "BLOW IT". Dare to compare–you won't find better value *anywhere.*

Manufacturing Company, Inc.
CURTIS
30 Fitzgerald Drive, Jaffrey, NH 03452 USA

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Curtis offers a complete line of ten different surge protectors.
For more information, call Curtis at 1-800-955-5544 Ext. 240

Upgradable Local Bus: IBM ValuePoints Go From VESA to PCI

A new Performance Series of IBM ValuePoint computers caters to buyers with BMW tastes and Buick pocketbooks. The products offer unique implementations of otherwise common technology at competitive prices. IBM has also added a long-awaited upgrade to its PS/2 line and a pen-based notebook.

Engineering for Users

In the new ValuePoints, choice of processor provides the first benefit. The top-of-the-line system is the first to sport a clock-doubled 486DX4-100 operating at 100 MHz on a system board running at 50 MHz. IBM claims this system performs up to 15 percent faster than a system running a clock-tripled DX4, which operates at 100 MHz on a system board running at 33 MHz. The new line is available with various other processors, including the 33-MHz 486SX and the 66-MHz 486DX2. Sample prices for base configurations range from $1560 for a 33-MHz 486SX to $2399 for a DX4-100.

Sizzling graphics are a further selling point. Incorporating a Vision864 64-bit graphics chip from S3 on the motherboard, the latest ValuePoints offer VESA local bus graphics. IBM claims graphics performance is more than 50 percent faster than with earlier models and that these units are among the first to integrate a 64-bit graphics chip. Although this 64-bit design ranks near the upper end of current graphics performance, the included 1MB of video RAM (upgradable to 2MB) is insufficient for handling the most demanding tasks, such as running certain programs in true color.

IBM'S NEW VALUEPOINT PCs are among the first to feature a DX4-100/50 chip, 64-bit graphics, and an upgradable local bus design.

For buyers unsure of whether they want a VESA local bus or a PCI local bus, IBM offers an innovative solution: the SelectaBus. The ValuePoints come standard with VESA local bus, which you can upgrade to a PCI local bus for $100. By waiting until PCI is more widespread, you may pay even less. The upgrade involves plugging a riser card with PCI slots into a proprietary slot on the motherboard. Good move, Big Blue.

One final nod toward high performance involves the use of a write-back secondary CPU cache, which IBM claims outperforms the more common write-through cache.

The systems come with 270MB hard drives; 346MB, 540MB, and 728MB drives are optional. Memory is expandable to 128MB. The systems are preloaded with either OS/2 2.11 or IBM's PC-DOS 6.3 in conjunction with Windows 3.11. You can have various other software preinstalled via IBM's Soft Select service. Support is available 24 hours a day, every day, throughout the three-year warranty period. The systems comply with the federal government's Energy Star power management specification.

Finally, a New PS/2

Companies that use IBM's Personal System/2 computers, with the proprietary Micro Channel architecture, will be cheered by some new additions to this line. With processors ranging from a 50-MHz 486SX2 to a 100-MHz DX4, the machines are available immediately in Europe, with supply expected later this year in North and South America. At press time, it appeared likely that these PS/2s would come with full-screen and full-motion video. No pricing was available.

IBM also introduced a portable, the ThinkPad 730T, for pen-based apps. With a transflective, indoor-outdoor screen, it has a battery life of up to 10 hours through a dual-battery arrangement, and a weight as low as 3.5 pounds with one battery. The 730T offers either two PCMCIA Type III or three Type II slots.

Like the other new ThinkPads discussed in the July *Top of the News* section of *PC World*, the 730T includes the IBM PC Card Manager, a utility that allows automatic configuration of many PCMCIA expansion cards, a feature Compaq introduced earlier in 1994.

—Joe Abernathy

IBM ValuePoint Performance Series

High-performance PCs at attractive prices.
IBM
800/772-2227
List prices: 486SX-33 with 4MB RAM, 270MB hard drive, low-profile case $1560; similarly configured DX4-100 $2399

A Less Awkward, More Useful Notebook Trackball

Nobody really likes notebook trackballs. While both clip-on and integrated trackballs are fine for cramped spaces such as airline seats, they're often awkward to use. And once you've checked into a hotel, you probably have sufficient desktop space for a larger pointing device that's easier on your wrist.

Enter Logitech's TrackMan Voyager, an innovative trackball that works in five different positions. Designed for portables without a built-in pointer, Voyager operates in front of the keyboard or to either side, as a hand-held device, or as a desktop trackball controlled by your thumb or forefinger. The key to Voyager's versatility is its ingenious design. Using the Voyager's attachment device, you can snap the trackball onto the side of your notebook. Or you can attach Voyager's protective cover to the unit's flat edge, creating a freestanding trackball with an extension for resting the palm of your hand.

Whenever you change Voyager's orientation from, for example, a clip-on to a desktop trackball, you'll have to reconfigure the device. Using Logitech's MouseWare utility, you redefine which direction is up based on the current position of the trackball. The software also lets you assign shortcuts to any of Voyager's three buttons. For instance, you can reduce the repetitive strain of double-clicking by assigning the double-click command to a specific button.

Although I found Voyager's tiny trackball and buttons a bit cramped for my taste, the unit's certainly an improvement over most notebook pointing devices. However, if your notebook already comes equipped with a built-in pointer, you may find Voyager an unnecessary expense at $69.95.

—Jeff Bertolucci

MULTIFUNCTION TRACKBALL: Logitech's TrackMan Voyager operates as a clip-on or freestanding trackball.

TrackMan Voyager

This versatile notebook trackball works in a variety of positions.
Logitech, Inc.
800/231-7717
List price: $69.95
Reader service no. 675

New Quad-Speed CD ROM Drives Break Price Barrier

Early single-speed CD ROM drives were virtually useless for multimedia apps because their poky 150 kilobytes per second (K/sec) data-transfer rate delivered jerky, unnatural video and animation. Double-speed (300 K/sec) models do a better job, but today's cutting-edge multimedia apps push them to their limits. Recently, some vendors began to produce quad-speed (600 K/sec) drives that deliver smooth motion, but they've been selling for $1000-plus. That's all about to change.

Plextor and Teac have both introduced low-cost quad-speed drives. Expect street prices to be in the $450 to $550 range.

The two companies take slightly different approaches. Plextor's 4Plex PX-43CH drive uses a standard SCSI interface. If you've already installed a SCSI board, you can just plug in the drive and go. If you haven't, adding an interface card gives you future expansion capabilities. For $50 extra, Plextor supplies an industry-standard 16-bit Future Domain or Adaptec card. There is a downside, however: Installing a SCSI board and peripherals can be difficult.

The 4Plex offers an adequate 220ms access time, but data transfer rate rather than access time is the crucial measure of drive performance for multimedia; the 4Plex, like the Super Quad, boasts a blistering rate of 600K/sec. Another mark in the 4Plex's favor is a built-in 1MB buffer that should dramatically improve overall performance.

The Teac Super Quad connects to its 16-bit add-in card via a proprietary interface. Products with proprietary interfaces are considerably easier to install than their SCSI counterparts, but they can't accept additional peripherals. The Super Quad access time is about as fast as they come: 195ms. This makes the device particularly useful if you access lots of small files.

If you use CD ROMs only for standard text or data files, you don't need a quad-speed drive. But for serious multimedia use, faster is definitely better.

—Stan Miastkowski

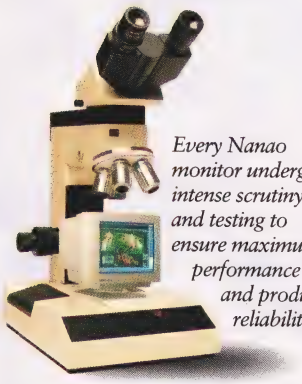
4Plex PX-43CH

MULTIMEDIA **A low-cost quad-speed CD ROM drive with a standard SCSI interface.**
Plextor
408/980-1838, 408/986-1010 (fax)
List price: internal $549, with SCSI board $599; external $649, with SCSI board $699
Reader service no. 676

Super Quad

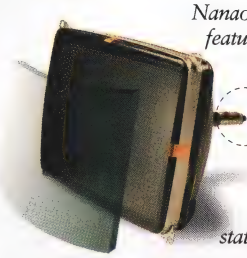
A low-cost quad-speed CD ROM drive with a proprietary interface.
Teac Data Storage Products Division
213/726-0303
List price: $655 (internal only)
Reader service no. 677

Superior In Every Detail.



Every Nanao monitor undergoes intense scrutiny and testing to ensure maximum performance and product reliability.

At Nanao, details make all the difference in creating our family of professional display monitors. From the product design and manufacturing that takes place in our factory to the end user's working environment, Nanao pays attention to every detail. In engineering. Assembly. Product testing. Quality control. Shipping. Customer support. From the very first days of the company, we set out to be an innovator in monitor technology. And, in a few short years, we have achieved that goal. Today, Nanao has the lowest repair rate in the monitor industry, the highest product reliability, and a fast-growing number of enthusiastic customers. So if you're looking for a superior monitor, start with the details. We do.



Nanao monitors feature protective coatings and panels that reduce glare and eliminate static electricity.

Nanao T Series and F Series monitors have captured every major award from the industry's leading publications.

Nanao was the first monitor company to join in partnership with the EPA Energy Star Program.

3 YEAR WARRANTY

Model	Size	Dot Pitch	Scan Frequency	Recommended Resolution
T660*i*	20"	0.30mm	H:30-82kHz V:55-90Hz	1280x1024
T560*i*	17"	0.25mm	H:30-82kHz V:55-90Hz	1280x1024
F780*i*-W	21"	0.26mm	H:45-100kHz V:55-120Hz	1600x1200
F760*i*-W	21"	0.28mm	H:30-78kHz V:55-90Hz	1280x1024
F560*i*-W	17"	0.26mm	H:30-82kHz V:55-90Hz	1280x1024
F550*i*-W	17"	0.28mm	H:27-65kHz V:55-90Hz	1024x768
F340*i*-W	15"	0.28mm	H:27-61.5kHz V:55-90Hz	1024x768

Our monitor family teams ultra high resolution with a list of impressive technical specifications.

A heritage of precision craftsmanship and attention to detail has been designed into Nanao's family of display monitors.

1-800-800-5202

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(310) 325-5202 Fax: (310) 530-1679

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Circle 194 on reader service card

Hand-Held DataPen Scanner Offers Portable, Painless OCR

Moving text from paper to PC with OCR has just gotten easier, thanks to Primax's DataPen. Simply hold the unit in your hand, roll it across a line of text you want to input, and voilà—editable text appears in your Windows Clipboard or Windows application. The DataPen offers a handy option for mobile users or those who want to import modest amounts of text with minimal frustration.

The DataPen plugs into the parallel port and draws power either from a battery pack that snaps onto the unit's parallel port adapter, or from your PC via a connector that attaches to your keyboard cable. Mobile users will appreciate the DataPen's nominal weight and the convenience of a battery pack that accepts ubiquitous AAA batteries (included).

DataPen's OCR software supports 11 languages plus font sizes ranging from 8 to 22 points. You can also program a macro button on the DataPen to minimize typing. For example, you could have the button work like the <Enter> key, <Space> key, or a string of asterisks to separate text you input.

Since the DataPen and its OCR software work within any Windows application, you never have to convert text to another file format or push a button to start the recognition process as you do with traditional scanner and OCR packages.

As with any hand-held unit, the greatest challenge for users is scanning text in a straight line and getting accurate OCR. While the company claims 99.8 percent accuracy on documents with font sizes between 12 and 15 points, most book, magazine, and business card text is much smaller, so accuracy suffers. Count on having to make manual corrections after you scan. Still, this is a neat product and worth considering.

—Anita Hamilton

HAND-HELD TEXT SCANNER: Sweep the DataPen across the printed page, and within seconds editable text appears on screen.

DataPen

An innovative hand-held scanner for inputting text.
Primax
800/774-6291, 408/364-2800
List price: $399
Reader service no. 678

Canon Adds Subnotes—And More Notes That Print

Canon has beefed up its line of PC products with subnotebooks, more notebooks with built-in printers, and multimedia desktop systems.

The company's first subnotebooks include the Innova Book 10, which sports an 8.5-inch monochrome display, and the Innova Book 10C, which provides a 7.8-inch dual-scan color screen. The compact systems weigh just 4 pounds. Canon achieved this level of portability with typical compromises, such as making the floppy drive an optional external unit.

Both systems are powered by a 33-MHz 486SL processor and come with 4MB of RAM and a built-in trackball. The subnotebooks run for up to 3 hours per battery charge, according to the company. Estimated street prices begin at $1600 for the Model 10 and $2100 for the 10C, which will pit them against Compaq's similar Aero subnotebooks.

Canon's three new NoteJets, like the original product released last year, squeeze a PC *and* a 360-by-360-dpi BubbleJet printer into a unit slightly bulkier than an ordinary notebook. The new low end of the line, the 8.8-pound NoteJet 486, has a 33-MHz 486SX CPU with a 9.5-inch monochrome display and a hand-held trackball. The NoteJet 486C uses a 9.5-inch dual-scan color display without adding weight. Street prices start at $2299 for the 486 and $2699 for the 486C. At the high end, the 8.6-pound $3299 NoteJet II 486C is a slightly smaller and lighter unit that includes IBM's 50-MHz 486SLC2 processor, a 10.3-inch dual-scan color screen, and a keyboard-mounted pointing stick, the same TrackPoint II device IBM uses in its ThinkPads.

Along with the new portables, Canon has added two desktop systems aimed at multimedia newcomers. The Innova Vision L33/210 is a 33-MHz 486SX-based unit, and the more powerful L50/340 has a 50-MHz 486DX2 CPU. Both units have 4MB of RAM (expandable to 36MB), a double-speed CD ROM drive, a Sound Blaster 16 sound card, external speakers, and a 14-inch super-VGA monitor. Estimated street prices range from $1599 to $1999.

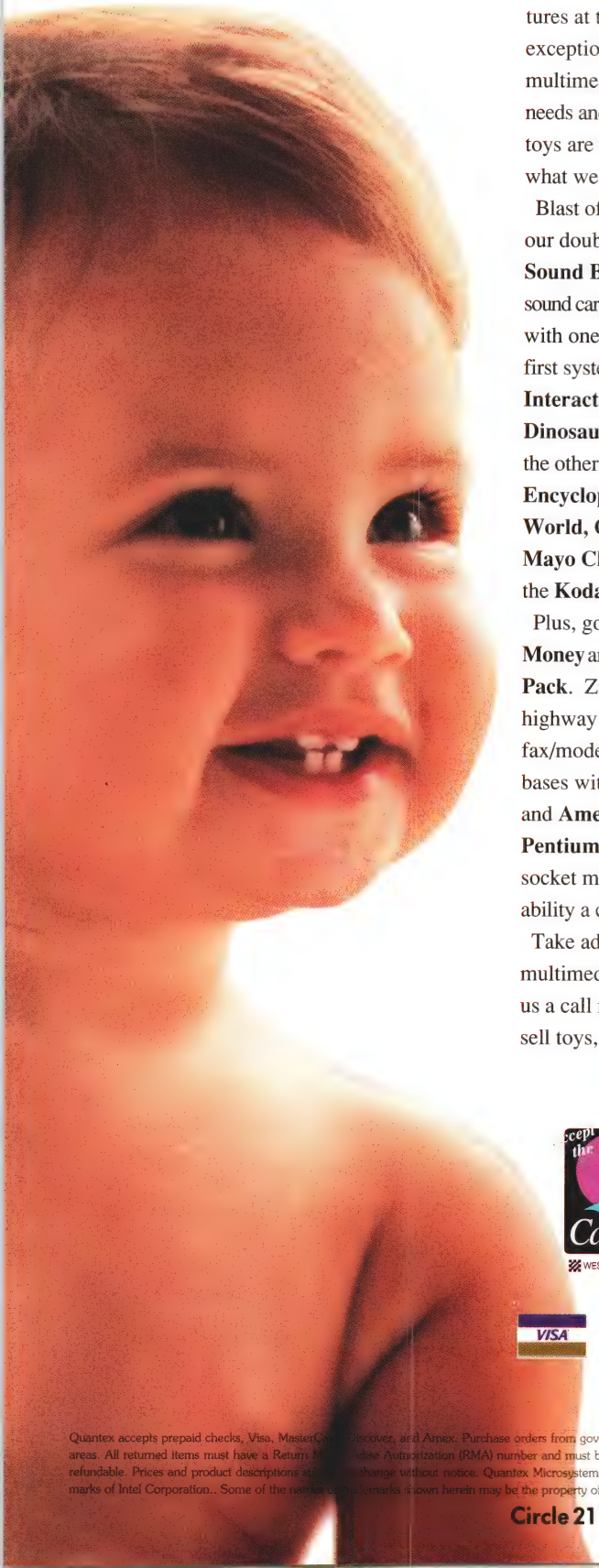
—Harry McCracken

Innova Book, NoteJet, Innova Vision

Canon's new subnotebooks, notebook/printer combos, and multimedia desktops.
Canon Computer Systems, Inc.
800/848-4123
Estimated street prices: Innnova Book $1600–$2100, NoteJets $2299–$3299, Innova Vision $1599–$1999
Reader service no. 679

Serious Savings on Toys!

A Quantex Multimedia Package Priced to Make You Smile



The cost of computer toys can really add up. That's why, at Quantex, we're committed to giving you the most features at the best prices. Multimedia is no exception. Quantex has put togther two multimedia packages that will meet your needs and excite your senses. And these toys are no kid's stuff. Take a look at what we've got for you.

Blast off to **MPC Level 2** standards with our double-spin **CD-ROM** drive and **Sound Blaster™** compatible 16-bit stereo sound card with stereo speakers. Run wild with one of these CD-ROM bundles: the first system includes **Compton's Interactive Encyclopedia™, Microsoft® Dinosaurs,** and **Microsoft Works**, while the other features **Compton's Interactive Encyclopedia, Dictionary of the Living World, Compton's Family Choice, Mayo Clinic Family Health Book,** and the **Kodak® Photo CD**!

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Multimedia Systems

Q486SX/33VM-1 $1395

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- 5-Bay desktop case
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- 16-Bit Stereo Sound Card w/speakers
- MS-DOS & WFW 3.11
- 3 CD Discs: Compton's Interactive Encyclopedia, MS-Dinosaurs & MS-Works
- MS-Money & MS-Entertainment Pack
- Prodigy, Compuserve, and America On-Line

Q486DX2/50VM-1	**$1575**
Q486DX2/66VM-1	**$1595**
Q486DX4/100VM-1	**$1895**

QP5/60PM-1 $2295

PCI SYSTEM

- Intel Pentium™ Processor
- 8MB RAM, 256KB Fast Cache
- 420MB 12ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- PCI Bus Graphics Accelerator w/ 1MB
- PCI Local Bus Enhanced IDE controller
- 15" Digital Color NI Monitor
- 11-Bay Mid-Tower case
- 101-Key enhanced keyboard & Mouse
- 14,400 Baud Fax/Modem w/software
- Double-spin multisession CD-ROM drive
- 16-Bit Stereo Sound Card w/speakers
- MS-DOS & WFW 3.11
- 5 CD Discs: Compton's Interactive Encyclopedia, Compton's Family Choice, Dictonary of the Living World, Mayo Clinic Family Health Book, and Kodak Photo CD
- MS-Money & MS-Entertainment Pack
- Prodigy, Compuserve, and America On-Line

Q486DX2/66PM-1	**$1975**
QP5/66PM-1	**$2395**
QP5/90PM-1	**$2595**

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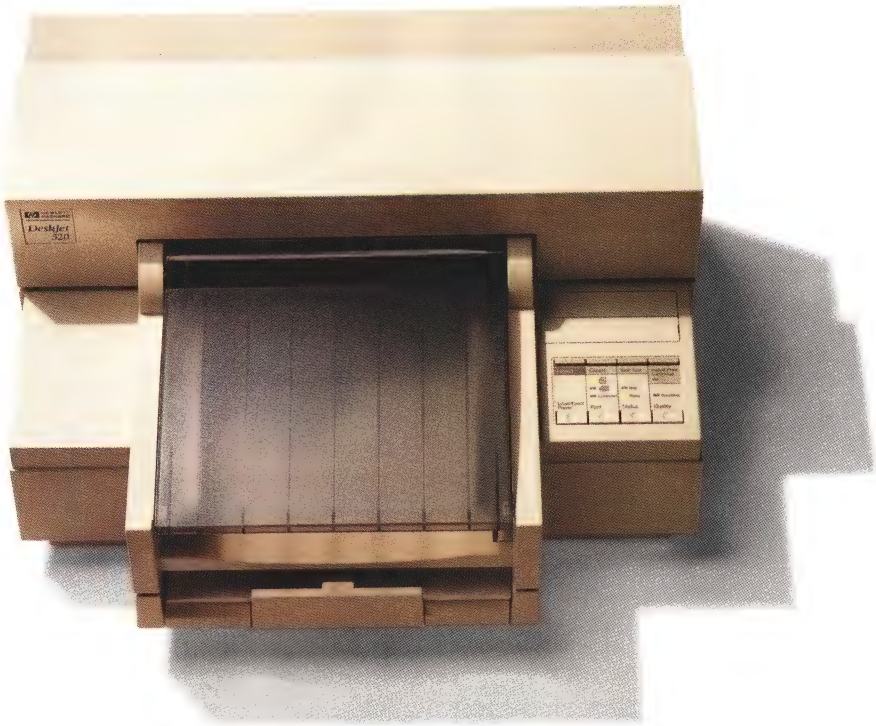
Circle 211 on reader service card

High Talk.



The HP DeskJet 520

The new HP DeskJet 520 boasts 600 x 300 dpi printing. In reality, this represents addressability, *not* printed output. In fact, the High Definition EPSON Stylus 800 delivers 44% more dots per square inch than HP. That's 129,600 printed dots per square inch for EPSON vs. 90,000 for HP. More dots means better looking print.

But there's even more to it than dots. EPSON Stylus technology, with our exclusive Multi-Layer Actuator Head, produces the finest printed output ever seen from a personal ink jet. No other personal ink jet has EPSON

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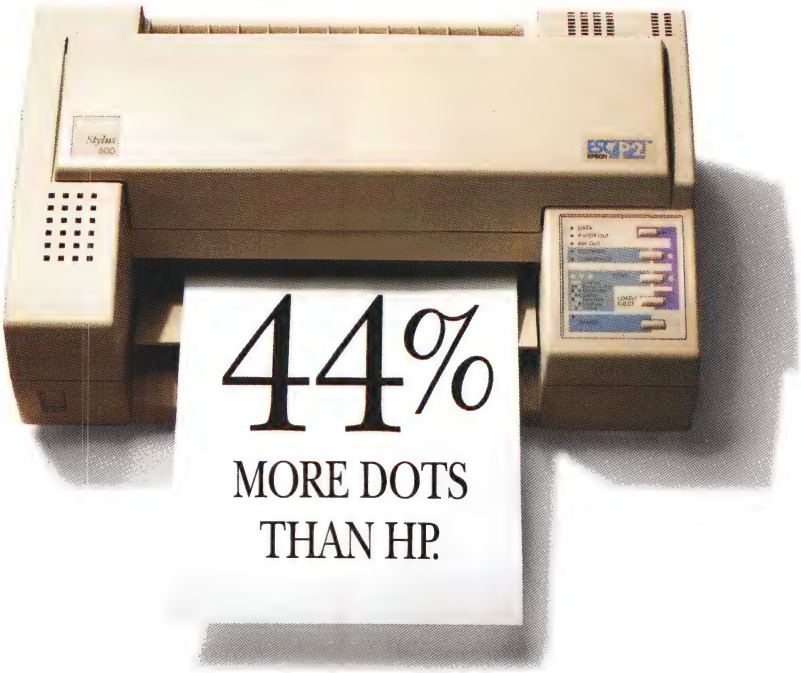
High Definition.



The High Definition
EPSON Stylus 800

Stylus technology, so no other personal ink jet produces images as clear and crisp.

It all adds up to one thing: the High Definition EPSON Stylus 800 is a better printer. Visit your EPSON dealer for even more detail or call

1-800-BUY-EPSON.

EPSON

Ecco Professional 2.0: Network Features Make a Good PIM Better

How do you improve on a tried-and-true personal information manager? Network it, add work-group features, and make it cheaper. On the theory that no one works in a vacuum, Arabesque Software has added new network features to the second release of Ecco Professional, making the product even more powerful.

Designed to enhance work-group collaboration, Ecco Professional 2.0 allows users to schedule group meetings; share phone books, calendars, and outlines; and replicate shared files. You still get the same features that made Ecco Professional 1.0 a useful day planner, contact manager, and task organizer—plus a few new ones. And if you'd rather not use the work-group features, don't enable them at setup. Perhaps the best news is the price. At $279, Ecco 2.0 is more than $100 cheaper than its predecessor.

Ecco Professional works with popular E-mail programs like Microsoft Mail, Lotus cc:Mail, and other MAPI-, VIM-, MHS-, or CMC-compatible software, to route information across a network. This is particularly useful in the multiuser calendar feature, which is integrated with Microsoft Schedule+ and allows users to see each other's schedules to plan meetings, book conference rooms, and invite their colleagues. Like a smart calendar should, Ecco alerts you to scheduling conflicts and suggests the next appointment time available to all invitees.

You can also E-mail meeting notes and agenda items or use the calendar to collect notes. Open the calendar to the date and time of a meeting, and Ecco Professional automatically arranges the notes into bulleted items for at-a-glance viewing. Drag-and-drop features let you organize your notes quickly—you can prioritize items by dragging the most salient points to the top of the page.

If you're working remotely, you still need to keep abreast of the latest developments in the office. Ecco's file replication utility allows mobile users to copy their Ecco schedules (and other files) to a remote PC. When you return to the office, use the synchronization tool to update your Ecco files automatically with changes made to the group files.

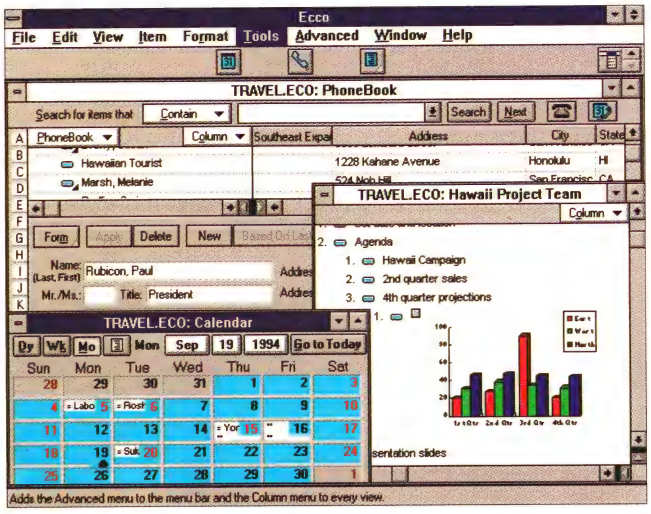
Ecco Professional's interface has improved. Now you can double-click folders to see their contents, and drag and drop notes, folders, and bulleted items between views. But Ecco isn't what you'd call pretty. Liberal use of battleship gray and sky blue make this product utilitarian looking.

Arabesque has also network-enabled its stripped-down version of the PIM, called Ecco Simplicity. This product offers many of the same features as the Professional version but isn't as customizable.

—Caroline Jones

Ecco Professional 2.0, Ecco Simplicity 2.0

Work-group features allow users to manage information over a network.
Arabesque Software
800/457-4243, 206/885-4272
List price: $279 for Professional version, $99 for Simplicity
Reader service no. 712



ECCO PROFESSIONAL 2.0 adds new networking and work-group features and is over $100 cheaper than its predecessor.

From Inspiration to Diagrams

If you're still brainstorming ideas on a white board or on the back of a cocktail napkin, you know there must be a better way: White boards tend to get erased, and napkins may not go over well when submitted to your boss. Enter Inspiration 4 for Windows, a program that aids the entire creative process—from developing concepts to presenting them in an appealing form.

Long available for the Macintosh, Inspiration bears some resemblance to flowchart and business graphics packages. Non-artists can use it to whip up flowcharts, organizational charts, and other business diagrams that involve text boxes and various shapes connected by lines. When it's time to share these diagrams with others, you can dress them up with symbols like pushpins and light bulbs, or even create text boxes in fun shapes such as airplanes, clouds, and easels.

But Inspiration is not simply a graphics program. Like a word processor, it provides an outliner that lets you enter ideas quickly and organize them into topics and subtopics. Alternatively, you can use Rapid Fire mode for typing in thoughts as quickly as they come. Inspiration also includes a spelling checker and search-and-replace tools.

This initial release of Inspiration doesn't support OLE, but you can export diagrams in various formats for use in presentations and other documents.

—Harry McCracken

Inspiration 4 for Windows

An easy way to turn ideas into attractive diagrams.
Inspiration Software, Inc.
503/245-9011, 503/246-4292 (fax)
List price: $129 until 12/31/94; $295 thereafter
Reader service no. 713

HOP ON!

IF YOU'RE NOT USING CANVAS™... YOU'RE MISSING OUT.

When the rubber hits the road, you can't afford to spin your wheels using yesterday's under-powered graphics software. You need drawing tools designed for today's high-tech tasks. Tools that deliver unrivaled speed and accuracy without inhibitions. That's Canvas for Windows.

Canvas fuses precision drawing, page layout, text handling, boardroom presentations and painting features in one easy-to-master application. Enjoy your work and become more productive with just the right combination of tools to break away from the pack. Without sacrificing quality or compromising your creativity.

Canvas for Windows has taken the graphics industry by storm. If you haven't heard the thunder, it's time you did.

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Listen to the 400,000† high-tech professionals worldwide who power up Canvas every day in seven languages to produce today's top technical illustrations. Listen to the thousands of expert analysts from leading multinational corporations, government agencies and top educational institutions who have chosen Canvas as their graphics standard. Listen to computer experts at leading industry publications. They'll tell you that Canvas is the most advanced, cost-effective graphics solution. Period.

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Needless to say, Canvas for Windows has all the drawing tools and features you'll probably ever need. From freehand Bézier curves to 1/65,000th-inch precision. From 15 flavors of auto-dimensioning tools to built-in color separations. From 24-bit color painting to 20 industry-standard import/export tools, including CDR, DRW and DXF. And thanks to our unique Open Architecture Technology (OAT™*), there's plenty of raw power available and even more when you need it. As proof, let us point out that every detail of this ad was created and color separated within Canvas for Windows.

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Stop grinding your gears with old technology. Quit wasting valuable time and energy with outdated graphics tools. Dust off your leather jacket, put on your baddest shades, then visit your favorite Canvas reseller today. Or call 1-800-733-6322 to order, and hop on for the ride of your life. Helmet not included.

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†Even more by the time you read this! Major credit cards accepted. Add $10 shipping in the US and $15 in Canada. Call for shipping costs elsewhere. ©1994 Deneba Systems, Inc. Canvas is a trademark of Deneba Software. Windows is a trademark of Microsoft Corporation. Macintosh is a registered trademark of Apple Computer, Inc. *OATs are good for you. Offer valid in the United States and Canada and is subject to termination or change without notice. This offer is not valid with any other promotion or offer.

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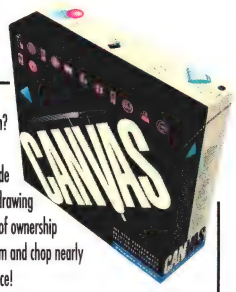
$99.95 COMPETITIVE UPGRADE



Still using some other graphics program? Now we've made switching to Canvas even easier! Keep their clip art, but trade in that scooter for some real precision drawing power. Simply show your dealer proof of ownership of any Windows-based graphics program and chop nearly $300 off Canvas' already low $399 price!

Circle 76 on reader service card

Dirt-Cheap Desktop Publisher Adds High-End Features

Serif's PagePlus 3.0 packs in more high-end desktop publishing features but retains its bargain price of $60. While the previous version of this desktop publishing program worked well, it lacked important features—including automatic page numbering, a built-in word processor, and well-designed master pages—that you'd find in high-end programs like the $589 Aldus PageMaker 5.0. But times change. PagePlus 3.0 delivers these features, plus precision typographic controls and ease-of-use improvements. It's not PageMaker, but it's a lot of desktop publisher for the money.

Designed for both novices and experts, PagePlus 3.0's interface resembles an old-fashioned pasteup board. The program now lets you choose from three operation modes: Intro, Publisher, and Professional. In Intro mode, the program displays shorter menus and gives frequent pop-up tips to guide beginners. Publisher mode, for tasks such as creating a newsletters, offers all the tips but not all the high-end controls, such as kerning features. Professional mode provides the highest-level features, including typographic controls. Everyone will like the layout checker, which reports errors such as a picture running off the page borders. PagePlus 3.0 also has 100 new and enhanced templates for creating documents quickly.

For longer documents, PagePlus 3.0 offers improved master pages that let you repeat a common element (such as a header) on each page, and automatic page numbering. PagePlus 3.0 also boasts WritePlus, a built-in word processor that resembles the Story Editor in PageMaker. WritePlus pops up in a window on the layout page and supports operations like cut-and-paste. Serif has included a spelling checker, thesaurus, and grammar checker, too.

New typographic controls and color capabilities enhance PagePlus 3.0's professional publishing capabilities. Typographic controls include specification of leading (space between lines) and adjustments for kerning (space between letters).

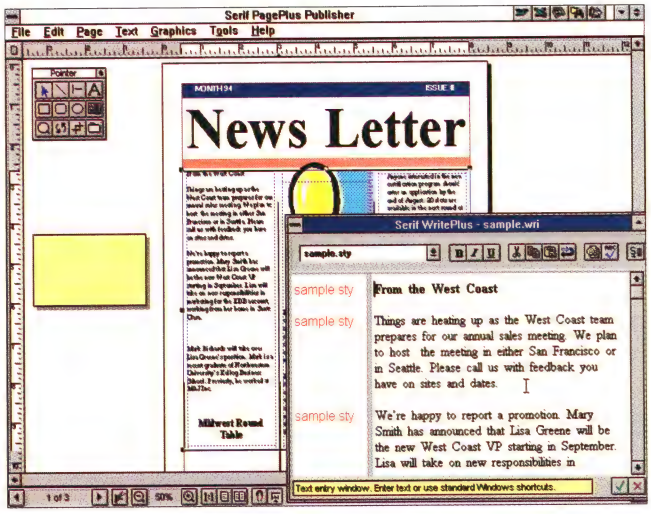
Serif has introduced add-on modules for tables, drawings, special text effects, photographic image enhancement, clip art, and fonts. A version of PagePlus 3.0 that includes the draw, table, type, and photo modules costs $99.95. Serif also plans to release a CD ROM version that will include all the modules, plus clip art and fonts.

While PagePlus offers a lot for $60, Aldus PageMaker will still prove popular among high-end publishing professionals for its PostScript font support and its print capabilities (such as printing thumbnail images of pages). Also, many third-party vendors sell PageMaker add-on modules that offer high-end capabilities such as special color control and text effects.

—Laurianne McLaughlin

Serif PagePlus 3.0

Inexpensive desktop publisher adds high-end word processor and typographic controls.
Serif, Inc.
800/697-3743,
800/869-8909 (fax)
Direct price: $59.95, with modules $99.95
Reader service no. 714



DISCOUNT DESKTOP PUBLISHER: For $60, Serif PagePlus 3.0 offers a word processor and 100 document templates.

Patent Lawyer in a Box

The economic reasons for patenting ideas are pretty obvious. Microsoft, for instance, makes a fortune just licensing its patents. But the economic reality of getting a patent is prohibitive. It can cost more than $5000 in legal fees to see an idea through the patent process. In addition to the complex legal and administrative process, you have to determine if your idea will bring in enough money to warrant the up-front costs. That's why Nolo Press has created Patent It Yourself, a program that plays the role of a patent lawyer and makes it possible for small companies and individuals to patent their ideas.

Patent It Yourself is so easy to use that any wild-haired inventor can manage it. You answer questions in an interview format; the program then prepares legal forms, searches for previous patents, and helps you evaluate the commercial potential of your patent. It even helps you respond if the U.S. Patent Office turns down your patent request. Even if your business has a large legal department, Patent It Yourself can streamline the patent-application procedure. For instance, if every creative mind in your company uses the program, the patent requests your legal department receives will be better organized and easier to process. The program includes the complete text of David Pressman's best-selling book *Patent It Yourself*. And Nolo Press provides free technical support.

—Christina Wood

Patent It Yourself

Guides average folks through the patent application process.
Nolo Press
800/992-6656
List price: $229.95
Reader service no. 715

New Delrina WinComm PRO makes powerful communications easy. So why struggle with Procomm?

Delrina WinComm PRO™

Procomm Plus™ for Windows

To take part in the on-line revolution, you'll need a powerful communications package.

One that handles all major file transfer protocols, like Zmodem, Xmodem, Ymodem, Kermit and others. One that supports every popular terminal emulation. And has a powerful scripting language for automating on-line sessions.

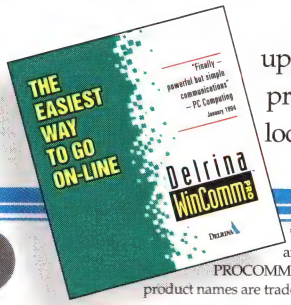
But perhaps you'd prefer software that puts that power right in front of you in a clean, intuitive interface. One that not only makes it easier to go on-line but simpler to do things once you're there. With features like a customizable, icon-based phonebook. Drag-and-drop file transfer. A customizable button bar where you can place your most common tasks. Even a scrollback buffer that lets you refer back to text from your current session, as well as text from previous sessions.

In that case the only choice is new Delrina WinComm PRO™. The one *PC Computing* called "...Intuitive enough for a novice user, yet still packed with enough sophisticated features to keep an on-line junkie happy."

	Delrina WinComm PRO	Procomm Plus™ for Windows*
Pre-defined scripts for on-line services	MCI Mail, CompuServe, GEnie, AT&T Mail, BIX, Delphi, Dow Jones & NewsNet	MCI Mail & CompuServe
Drag-and-drop file sending	Yes	No
Built-in script recorder	Yes	Yes
Phonebook	Customizable	Fixed
Split-screen session window	Yes	No
Scrollback buffer	200 pages	31 pages
Supports all popular file transfer protocols and terminal emulations	Yes	Yes
Virus detection during download	Yes	No
Shares a COM port with WinFax PRO	Yes	No
Integrated off-line text editor	Yes	No

Buy Delrina WinComm PRO alone, or as part of the money-saving Delrina Communications Suite™ which also includes Delrina WinFax PRO™, far and away the best-selling fax software in the world. Either way, you'll have the power you need and the ease of use you've only dreamed of.

Call for information or to upgrade from any Procomm product for just $49. Or see your local dealer to upgrade immediately.



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Circle 171 on reader service card

Manage Your Sales Contacts With TeleMagic for Windows

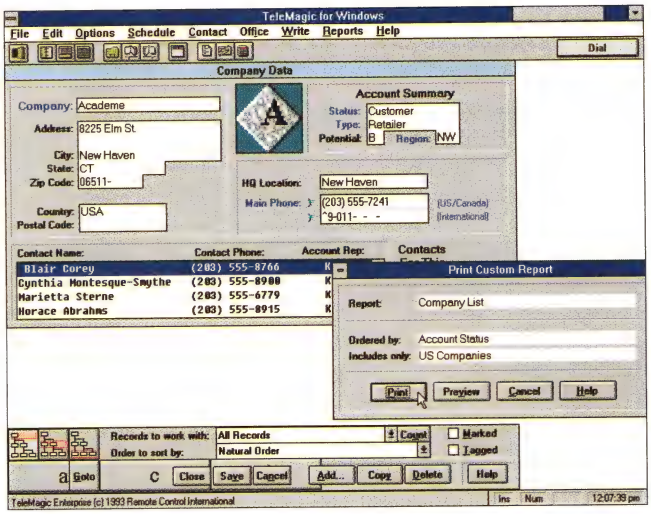
TeleMagic, a networkable, highly customizable application aimed at sales representatives, helps you track contacts, schedule appointments, and manage your daily jumble of tasks. At $499 (or $1299 for a five-user pack), TeleMagic is too expensive for the home or small office but could prove valuable in networked offices that need a specialized application to manage phone-intensive sales work. This first Windows version looks good overall, despite a few calendar glitches.

Many of TeleMagic's features are customizable—for example, sales reports, and search filters and fields in the contacts database. TeleMagic uses a three-level relational database for storing linked contact information, including company information, business contacts, and sales agreements, in different database levels.

TeleMagic's interface is not as intuitive as that of some contact managers, but its phone capabilities are solid. Whenever you make a call, TeleMagic logs the call in a database and lets you take notes in an attached notepad. When you hang up, a dialog box asks for the next time you want to call back. TeleMagic includes extensive reporting capabilities for creating activity reports by salesperson, territory, and so on.

TeleMagic's to-do list and daily calendar for scheduling look like those of a Day-Timer. You can send to-do items to other users on the network and view people's schedules. (The program has security features to limit access.) However, TeleMagic won't check automatically to see if users are free for a meeting time. Its weekly and monthly calendars are subpar, displaying icons to represent meetings and events rather than using text descriptions.

—Laurianne McLaughlin



TELEMAGIC FOR WINDOWS is a contact manager for salespeople, which tracks contacts in a three-level relational database.

TeleMagic for Windows

LAN-ready, customizable contact manager for phone-intensive sales work.
TeleMagic Inc.
800/835-6244, 619/431-4006 (fax)
List price: $499, five-user pack $1299
Reader service no. 716

Looks Like a Word Processor, Acts Like a Database

When the veteran DOS database askSam came to Windows last year, its straightforward look and feel owed more to Microsoft Word for Windows than to Paradox, Access, or FoxPro. With over 200 major and minor improvements, askSam 2.0 for Windows is an upgrade that makes this unique, free-form database an even better choice for users who'd rather not have to learn about databases.

Anyone who's used a Windows word processor should find the transition to askSam exceptionally easy, thanks to editing and formatting tools that behave just like their word processing counterparts. You perform simple text searches with a command line that's always available on screen; menu choices let you do more sophisticated tasks such as Boolean and proximity searches.

Some of version 2.0's additions—for example, the spelling checker—fill significant gaps in askSam 1.0's feature set. Designing report layouts was a chore in the earlier version; now you just drag field names off a palette and onto the report.

Version 2.0's hyperlink feature lets you use askSam for a whole new purpose: designing sophisticated hypertext documents. You can turn any word in a document into a hyperlink that causes askSam to jump to another part of the database, open a new database or report, or even execute a menu command. Inexperienced users can then navigate these documents by simply pointing and clicking.

All these features equip the program for tasks that involve transforming large amounts of random text information—such as E-mail messages or online documentation—into a well-organized database.

What askSam really isn't designed to tackle are the complex, highly customized applications that are the forte of such databases as dBASE and Paradox. While version 2.0 can search multiple files with a single command, it's still a flat-file program and can't link several files into a truly unified database. The program also doesn't offer any macro or programming language. But users who prize ease of use over advanced features may find that askSam 2.0 is just the solution they have been looking for.

—Harry McCracken

askSam 2.0 for Windows

Unique free-form database now has hyperlinks.
askSam Systems
800/800-1997, 904/584-6590
List price: $149.95 for first 90 days after August release, $395 thereafter; upgrade from previous version $79.95
Reader service no. 717

ONE OF IBM'S MOST SURPRISING INNOVATIONS ISN'T A PRODUCT.

IT'S A COMPANY.

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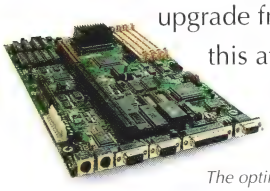
"...The D466 I/VL [Is] The Fastest 486DX2/66 We've Ever Tested." *–InfoWorld, April 4, 1994*

This is computing so advanced it will be years before you take full advantage of it. Already the industry's fastest 486DX2/66, the D466 I/VL utilizes new, enhanced performance Tseng W32P drivers to deliver up to 20% faster video performance. Want to see all the details? Upgrade to 800x600 True Color. To keep you ahead, there's an upgrade path to Pentium technology. And it's the first PC you can upgrade from VESA® to PCI. All of this at a price you'll want to take full advantage of right now.



The optimized motherboard design exploits every last bit of processing power of the DX2 CPU.

Best Buy desktop model shown above. Mini-tower and other configurations also available.

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Get A Free Upgrade From A 14" To A 15" FST Monitor With The Purchase Of Any AMBRA I/VL System Below.[1]

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Business Lease: $63/Month

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- ▲ 256KB L2 Cache, Write-Back
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- ▲ 14" SVGA Color Monitor-LR
- ▲ VESA Local Bus Graphics Accelerator 1MB
- ▲ VESA Local Bus IDE Hard Drive Controller
- ▲ 4 16-bit ISA and 1 32-bit VL Bus Slots
- ▲ 3.5" 1.44MB Diskette Drive
- ▲ 5 Drive Bays
- ▲ High-Speed Serial Ports-16550 UART
- ▲ Parallel Port, ECP/EPP Supported
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- ▲ MS-DOS® 6.2, Windows™ 3.1, Mouse
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2 BEST BUY D466 I/VL $2499
Business Lease: $89/Month

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3 D4100 I/VL $2799
Business Lease: $99/Month

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- ▲ 16MB RAM, Max: 64MB
- ▲ 720MB IDE Hard Disk Drive
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- ▲ VESA Local Bus IDE Hard Drive Controller
- ▲ 4 16-bit ISA and 1 32-bit VL Bus Slots
- ▲ 3.5" 1.44MB Diskette Drive
- ▲ 5 Drive Bays
- ▲ High-Speed Serial Ports-16550 UART
- ▲ Parallel Port, ECP/EPP Supported
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InfoWorld, April 4, 1994

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Deliver high-performance personal computing at very low, very competitive prices. All backed by unwavering, unmatched service and support.

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LAR'S MORE POWERFUL.

The 100MHz Notebook.

It's ideal for those who travel the fast track. Driven by a fast Intel DX4 100MHz processor, the N100 is a blur. The screen, however, is sharp and vivid—thanks to a 9.5-inch active matrix (TFT) display. Combined with the integrated audio playback and record functions, your multimedia presentations will be very sharp indeed. The N100 may be small, but it packs an impressive list of features. Such as a 450MB hard drive. An 85-key, full-size keyboard. And an integrated, easy-to-use 16mm trackball. All at a flyweight price. And all to help you fly through your workload.

Full-size keys mean fewer typos. And that should speed things up even more.

These notebooks pack a lot of power into a scant 6.7 pounds.

6 N75D-340 $3199
Business Lease: $114/Month

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- ▲ Type III PCMCIA Slot (1 Type III/ 2 Type II)
- ▲ 85-Key Keyboard
- ▲ Centered 16mm Trackball
- ▲ Integrated Audio (Speaker and Microphone)
- ▲ System Status Panel
- ▲ 6.7 Pounds, Including NiMH Battery
- ▲ MS-DOS 6.2
- ▲ Windows for Workgroups 3.11
- ▲ Includes AC Adapter and Case

7 N75T-340 $4299
Business Lease: $152/Month

- ▲ 75MHz Intel DX4
- ▲ 340MB Hard Disk Drive, Upgradable
- ▲ 9.5" Active Matrix TFT Color Display with Local Bus Video and 1MB Video RAM
- ▲ 4MB RAM, Max: 20MB
- ▲ 3.5" 1.44MB Diskette Drive
- ▲ Type III PCMCIA Slot (1 Type III/ 2 Type II)
- ▲ 85-Key Keyboard
- ▲ Centered 16mm Trackball
- ▲ Integrated Audio (Speaker and Microphone)
- ▲ System Status Panel
- ▲ 6.7 Pounds, Including NiMH Battery
- ▲ MS-DOS 6.2
- ▲ Windows for Workgroups 3.11
- ▲ Includes AC Adapter and Case

8 N100T-450 $5299
Business Lease: $187/Month

- ▲ 100MHz Intel DX4
- ▲ 450MB Hard Disk Drive, Upgradable
- ▲ 9.5" Active Matrix TFT Color Display with Local Bus Video and 1MB Video RAM
- ▲ 4MB RAM, Max: 20MB
- ▲ 3.5" 1.44MB Diskette Drive
- ▲ Type III PCMCIA Slot (1 Type III/ 2 Type II)
- ▲ 85-Key Keyboard
- ▲ Centered 16mm Trackball
- ▲ Integrated Audio (Speaker and Microphone)
- ▲ System Status Panel
- ▲ 6.7 Pounds, Including NiMH Battery
- ▲ MS-DOS 6.2
- ▲ Windows for Workgroups 3.11
- ▲ Includes AC Adapter and Case

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InfoWorld, May 23, 1994

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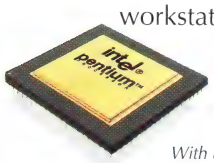
ANCED, EVEN YOUR DOLL

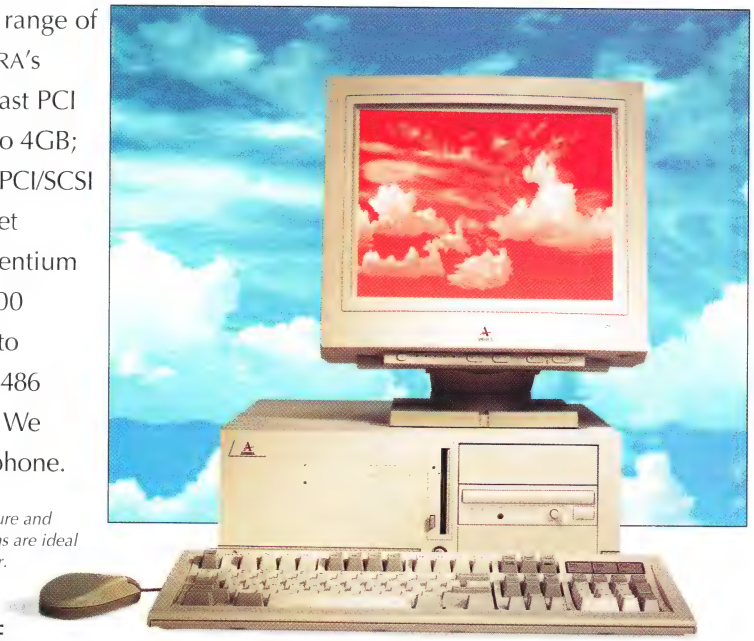
The Pentium Systems Of Choice.

"The AMBRA Pentium PCI Desktop makes it clear that this is the new Windows/Multimedia system standard."
—Windows Sources, April 1994

At last, you can get the new standard of power, the Pentium CPU. And with the widest range of peripherals to harness this power, AMBRA's where you should get it. Choose your fast PCI video card. Add hard drive capacity up to 4GB; mini-tower, up to 6GB. With PCI/IDE or PCI/SCSI controllers for faster throughput, you'll get transfer rates of up to 11MB/sec. And Pentium systems are compatible with over 50,000 legacy X86 applications. It all adds up to workstation-like performance at 486 prices. You get the idea. We suggest you get on the phone.



With up to 150MIPS, superscalar architecture and enhanced floating point, these Pentium systems are ideal for multimedia, CAD/CAM, or as a departmental server.



FREE MONITOR UPGRADE

Get A Free Upgrade From A 14" To A 15" FST Monitor With The Purchase Of Any AMBRA System Below.[1]

InfoWorld, March 14, 1994

4 DP60PCI $2599
Business Lease: $92/Month

- ▲ Intel 60MHz Pentium CPU
- ▲ 64-bit CPU-Memory-Cache Data Path
- ▲ 256KB L2 and 16KB L1 Cache
- ▲ 8MB RAM, Max: 128MB
- ▲ 720MB IDE Hard Disk Drive
- ▲ 14" SVGA Color Monitor-LR
- ▲ Phantom 32P PCI Graphics Accelerator 2MB
- ▲ Double-Speed Multisession CD-ROM Drive
- ▲ 4 ISA, 2 PCI and 1 ISA/PCI Slots
- ▲ Fast PCI/IDE Controller
- ▲ 3.5" 1.44MB Diskette Drive
- ▲ 6 Drive Bays
- ▲ Lexmark 101-Key Keyboard
- ▲ MS-DOS 6.2, Windows 3.1, Mouse
- ▲ Serial Ports-16550 UART
- ▲ Parallel Port-ECP/EPP
- ▲ 200 Watt Power Supply
- ▲ One-Year IBM Onsite Service

5 DP90PCI $2999
Business Lease: $106/Month

- ▲ Intel 90MHz Pentium CPU
- ▲ 64-bit CPU-Memory-Cache Data Path
- ▲ 256KB L2 and 16KB L1 Cache
- ▲ 8MB RAM, Max: 128MB
- ▲ 720MB IDE Hard Disk Drive
- ▲ 14" SVGA Color Monitor-LR
- ▲ Phantom 32P PCI Graphics Accelerator 2MB
- ▲ Double-Speed Multisession CD-ROM Drive
- ▲ 4 ISA, 2 PCI and 1 ISA/PCI Slots
- ▲ Fast PCI/IDE Controller
- ▲ 3.5" 1.44MB Diskette Drive
- ▲ 6 Drive Bays
- ▲ Lexmark 101-Key Keyboard
- ▲ MS-DOS 6.2, Windows 3.1, Mouse
- ▲ Serial Ports-16550 UART
- ▲ Parallel Port-ECP/EPP
- ▲ 200 Watt Power Supply
- ▲ One-Year IBM Onsite Service

DP90PCI POWER PACKAGE UPGRADE $599

- ▲ 16MB RAM
- ▲ PCI Diamond Viper Graphics Accelerator, 2MB VRAM
- ▲ Borland Office on CD-ROM
- ▲ Productivity Pack
- ▲ Order Code: DGBP02WF

HOT PENTIUM OPTIONS

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- ▲ Mini-Tower Upgrade **Add $75**
- ▲ PCI/SCSI Adapter **$325**
- ▲ 1GB Fast SCSI-2 Hard Disk Drive **$799**
- ▲ 2GB Fast SCSI-2 Hard Disk Drive **$1399**
- ▲ 14.4 kbps Fax/Modem Internal **$142**
- ▲ Matrox MGA II+, 2MB VRAM **$599**
- ▲ 17" FST-NI Color Monitor **$699**

WinMarks (4.0)			
	Phantom 32P	Diamond Viper	Matrox MGA II+
DP60PCI	17.7	19.7	25.9
DP90PCI	23.2	24.2	32.1

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- ▲ *MS-DOS® 6.2*
- ▲ *Windows™ 3.1*
- ▲ *Mouse*
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486 SYSTEMS

486SX/33MHz, Desktop
$1369 *Model D433SXA*
Business Lease: $48/Month
- ▲ 128KB L2 Cache, Max: 256KB
- ▲ 4MB RAM, Max: 36MB
- ▲ 270MB IDE Hard Disk Drive
- ▲ 14" SVGA Color Monitor-LR
- ▲ VESA® Local Bus Graphics Accelerator 1MB
- ▲ VESA Local Bus IDE Hard Drive Controller
- ▲ 5 ISA Slots & 5 Drive Bays

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$1519 *Model D466DXA*
Business Lease: $54/Month
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- ▲ 4MB RAM, Max: 36MB
- ▲ 270MB IDE Hard Disk Drive
- ▲ 14" SVGA Color Monitor-LR
- ▲ VESA Local Bus Graphics Accelerator 1MB
- ▲ VESA Local Bus IDE Hard Drive Controller
- ▲ 5 ISA Slots & 5 Drive Bays

486DX2/66MHz, Desktop
$1699 *Model D466DXA*
Business Lease: $60/Month
- ▲ 128KB L2 Cache, Max: 256KB
- ▲ 8MB RAM, Max: 36MB
- ▲ 270MB IDE Hard Disk Drive
- ▲ 14" SVGA Color Monitor-LR
- ▲ VESA Local Bus Graphics Accelerator 1MB
- ▲ VESA Local Bus IDE Hard Drive Controller
- ▲ 5 ISA Slots & 5 Drive Bays

UPGRADABLE BUS MODELS

486DX2/66MHz, Desktop
$1959 *Model D466 I/VL*
Business Lease: $70/Month
- ▲ 256KB L2 Cache, Write-Back
- ▲ 8MB RAM, Max: 64MB
- ▲ 420MB IDE Hard Disk Drive
- ▲ 14" SVGA Color Monitor-LR
- ▲ VESA Local Bus Graphics Accelerator 1MB
- ▲ VESA Local Bus IDE Hard Drive Controller
- ▲ 4 16-bit ISA & 1 32-bit VL Bus Slots
- ▲ 5 Drive Bays

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$2299 *Model D4100 I/VL*
Business Lease: $82/Month
- ▲ 16KB L1 & 256KB L2 Cache, Write-Back
- ▲ 8MB RAM, Max: 64MB
- ▲ 540MB IDE Hard Disk Drive
- ▲ 14" SVGA Color Monitor-LR
- ▲ VESA Local Bus Graphics Accelerator 1MB
- ▲ VESA Local Bus IDE Hard Drive Controller
- ▲ 4 16-bit ISA & 1 32-bit VL Bus Slots
- ▲ 5 Drive Bays

PENTIUM/PCI OR EISA

60MHz Intel Pentium, PCI
$2599 *Model DP60PCI*
Business Lease: $92/Month
- ▲ 64-bit CPU-Memory-Cache Data Path
- ▲ 256KB L2 & 16KB L1 Cache
- ▲ 8MB RAM, Max: 128MB
- ▲ 720MB IDE Hard Disk Drive
- ▲ 14" SVGA Color Monitor-LR
- ▲ PCI Graphics Accelerator 2MB
- ▲ Double-Speed Multisession CD-ROM Drive
- ▲ 4 ISA, 2 PCI & 1 ISA/PCI Slots
- ▲ Fast PCI /IDE Controller
- ▲ 6 Drive Bays
- ▲ 200 Watt Power Supply

60MHz Intel Pentium, EISA
$2899 *Model DP60 E/VL*
Business Lease: $103/Month
- ▲ 64-bit CPU-Memory-Cache Data Path
- ▲ 256KB L2 & 16KB L1 Cache
- ▲ 8MB RAM, Max: 64MB
- ▲ 6 EISA & 2 EISA/VESA Slots
- ▲ 540MB SCSI Hard Disk Drive
- ▲ 14" SVGA Color Monitor-LR
- ▲ Integrated SCSI-2 Controller
- ▲ VESA Graphics, 2MB VRAM
- ▲ 6 Drive Bays

InfoWorld, April 4, 1994

Call Now And Get A Free Upgrade From A 14" To A 15" FST Monitor On Select Models.[1]

intel inside

MOBILE SYSTEMS

486SX/25MHz
$1799 *Subnotebook Model SN425C-170*
Business Lease: $64/Month
- ▲ 7.8" Color STN Display
- ▲ 170MB Removable Hard Drive
- ▲ 4MB RAM, Max: 20MB
- ▲ External 3.5" Diskette Drive
- ▲ 1 Type II PCMCIA Slot
- ▲ 86-Key Keyboard
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486SX/33MHz
$1999 *Notebook Model N433C-120*
Business Lease: $71/Month
- ▲ 9.5" Dual Scan Color Display
- ▲ 4MB RAM, Max: 12MB
- ▲ 120MB Hard Disk Drive
- ▲ 3.5" Diskette Drive
- ▲ 1 Type III PCMCIA Slot
- ▲ 86-Key Keyboard
- ▲ Integrated 16mm Trackball
- ▲ MS-DOS 6.2, Windows 3.1
- ▲ Carrying Case
- ▲ 6.6 Pounds, Including Battery
- ▲ Borland Office (WordPerfect, Quattro Pro and Paradox)
- ▲ Borland Sidekick

486DX2/50MHz
$3599 *Notebook Model N450T-200*
Business Lease: $128/Month
- ▲ 9.5" Active Matrix TFT Color Display
- ▲ 8MB RAM, Max: 12MB
- ▲ 200MB Hard Disk Drive
- ▲ 3.5" Diskette Drive
- ▲ 1 Type III PCMCIA Slot
- ▲ 86-Key Keyboard
- ▲ Integrated 16mm Trackball
- ▲ MS-DOS 6.2, Windows 3.1
- ▲ Carrying Case
- ▲ 6.6 Pounds, Including Battery

Subnotebook Accessories

Road Warrior: $376
- ▲ PCMCIA 2.4/9.6 kbps Data/Fax Modem, Carrying Case
- ▲ Extra Battery, Battery Charger

Quick Dock: $404
- ▲ Port Replicator, Keyboard
- ▲ 14" SVGA Color Monitor

Notebook Accessories

Instant Office: $927
- ▲ Docking Station, Keyboard
- ▲ 15" FST-NI Color Monitor

Traveler: $278
- ▲ PCMCIA 2.4/9.6 kbps Data/Fax Modem, Extra Battery

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AMBRA™
AN IBM SUBSIDIARY

An Easier Way to Write Performance Reviews

In theory, employee performance appraisals are supposed to be an enlightening experience—both for the manager and the employee. In practice, however, these annual rituals are usually less than pleasant, largely because managers have too little time and energy to dig up the employee's files, remember all the relevant examples of good or bad performance, and write a long, complex document that sounds, well, managerial.

Sensing a growing hunger among managers for an easier way to perform this arduous task, two companies—Austin-Hayne Corporation and KnowledgePoint—have introduced packages that automate reviews. Both products—Austin-Hayne's $129 Employee Appraiser and KnowledgePoint's $169 Performance Now for Windows—offer a straightforward, fill-in-the-blank approach to appraisals that saves harried managers the hard, thankless work of writing.

Employee Appraiser automates appraisal writing by letting you fill out fields to create a nicely formatted form. The program then simplifies the actual writing by providing a pick list of skill areas (such as communication, teamwork, and so forth). Click a sublist of positive or negative qualities ("presents ideas clearly," "can use simple terms," and so on), and suggested text appears in a neighboring window where you can edit it. A scan feature lets you locate inappropriate words (such as "dumb") that would be grounds for a lawsuit, and offers more sensitive phrasing.

Like Employee Appraiser, Performance Now keeps a log of employee performance, and inserts canned text in a preformatted template to cover qualities such as job knowledge, initiative, and so on. But the program goes further by asking you to rate qualities on a scale from 1 (low) to 5 (high); when you choose a rating, suggested text appears. The program includes an online human resources adviser: Click the advice button to learn how to judge qualities such as communication ability. The adviser also coaches you on how best to conduct the review session. (Employee Appraiser has a similar coaching feature.)

While both programs simplify the review writing process, it takes some discipline to use them responsibly. It's a little too easy for a harried manager to simply accept the canned text, with the unhappy possibility that Mary's and Joe's reviews could end up sounding too much alike. However, managers who shudder at the prospect of annual reviews will appreciate these programs' helpful advice.

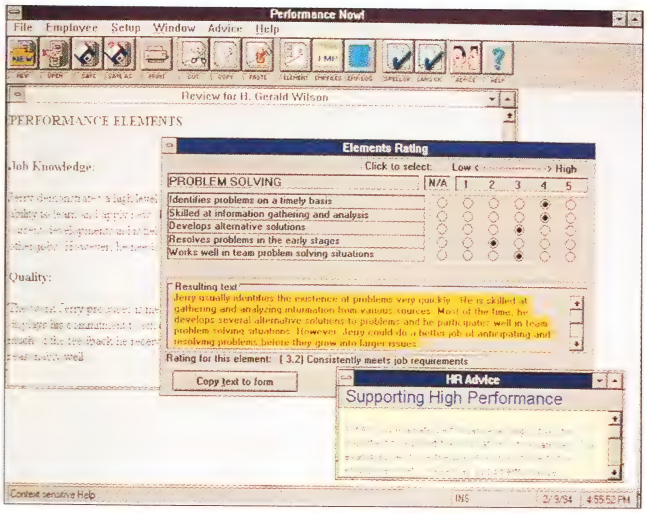
—Bronwyn Fryer

Employee Appraiser

Easy-to-use package for review writing.
Austin-Hayne Corp.
800/809-9920
List price: $129
Reader service no. 718

Performance Now for Windows

Sophisticated guide for employee reviews.
KnowledgePoint
707/762-0333, 707/762-0802 (fax)
List price: $169
Reader service no. 719



YOU CAN WRITE AN EMPLOYEE PERFORMANCE REVIEW in minutes using Performance Now for Windows' built-in rating system.

Multiple Masters Come to ATM

Once upon a time, if you wanted to view and print type in a variety of sizes, you needed Adobe Type Manager (ATM) and PostScript fonts. Then Microsoft changed the ground rules by including a passel of TrueType fonts in Windows 3.1. Adobe scrambled to make ATM competitive by improving performance and adding features. But the sad truth is, ATM has become a niche product—indispensable for professional desktop publishers and anyone dealing with a service bureau, but irrelevant to millions of business users satisfied with the cheap and ubiquitous TrueType fonts.

The newest version, ATM 3.0, may not broaden that audience, but it will please current ATM users. ATM now includes 30 typefaces, up from 13. And 10 of the new typefaces are Multiple Masters that users can manipulate—altering weight, width, optical size, or style—to generate a new font variation. For the design-conscious, the inclusion of the Multiple Master typeface Tekton may be enough to justify the package's $60 price. But Adobe hasn't gone far enough with this release. When you receive a document that contains fonts not present on your PC, ATM 3.0 doesn't use Multiple Masters to build look-alike fonts as substitutes. This feature has been available for a year and a half on the Macintosh, courtesy of SuperATM. Windows font mavens may just have to wait for the next ATM release.

—Steve Fox

Adobe Type Manager

Includes Multiple Masters, typefaces users can modify.
Adobe Systems
800/833-6687
List price: $60, upgrade $30
Reader service no. 720

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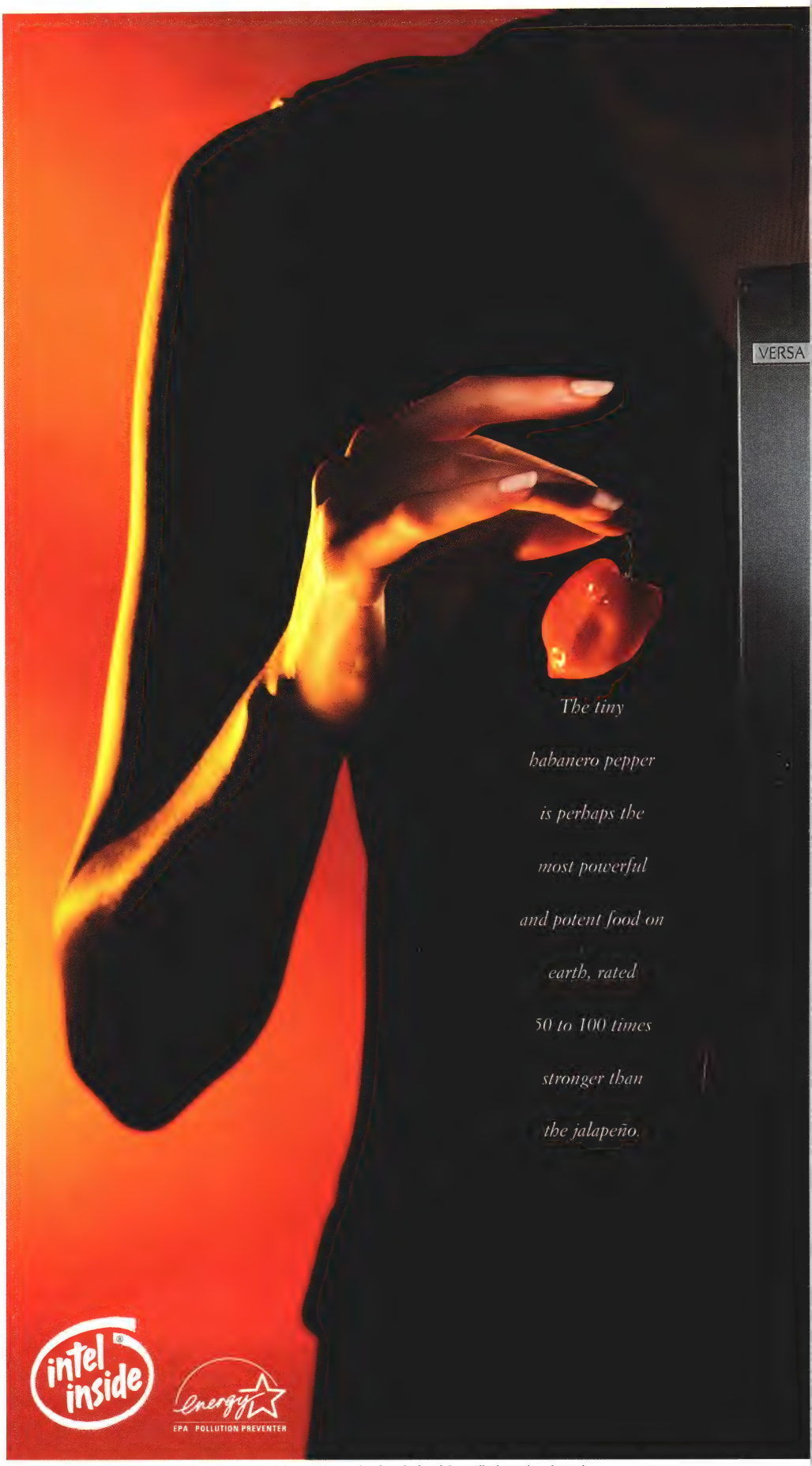
PACKAGE.



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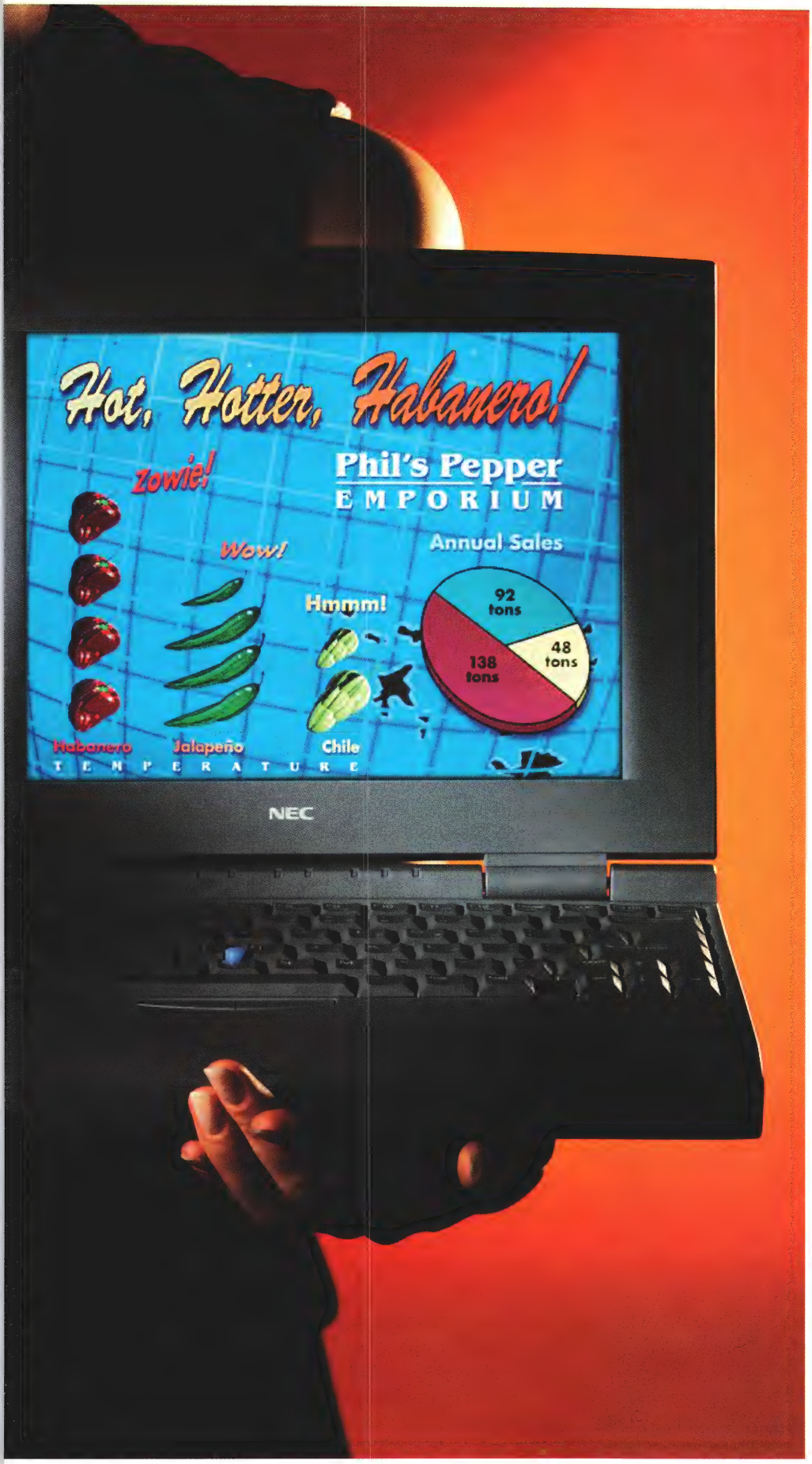

Here's a hot little notebook guaranteed to set your imagination on fire. Presenting the Versa™S notebook computer from NEC.

VERSA=VERSATILITY

Perhaps the most powerful notebook pound-for-pound (actually, starting at about 4 lbs.) on earth, thanks to the availability of an i486™ DX2/50 processor with on-board local bus video, up to 12 MB RAM and 260 MB hard disk storage. And wait until you get a taste of the unusually long list of standard features to be found on a computer this compact. Choose from a brilliant 9.5" color TFT, enhanced color DSTN or monochrome LCD display. The Versa S also has a large keyboard, PCMCIA Type III capabilities, serial, parallel, SVGA and keyboard/mouse ports. Yet, it folds to a svelte 1.4* inches.*

Now through August 31, get a free second battery when you buy a Versa S. Call 1-800-NEC-VERSA or see your dealer for details. The Versa S notebook. It's got the kind of powerful kick that would impress even Mother Nature.

SEE, HEAR AND FEEL THE DIFFERENCE.

NEC

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A World of Science on CD ROM

At $1300, the McGraw-Hill Multimedia Encyclopedia of Science & Technology is hardly an impulse item. But for anyone who works in or studies a scientific field (such as computers, astronomy, medicine, or chemistry) and needs frequent, easy access to a rich technical reference, this CD ROM could prove invaluable.

Actually, the disk is a bargain, comparatively speaking. The 20-volume print version (now in its seventh edition) includes the same 7300 articles as the CD ROM, yet it costs $600 more. In addition, the disk offers the entire contents of the *McGraw-Hill Dictionary of Scientific and Technical Terms* (105,000 terms and 122,600 definitions), which retails for $110.50. Then there's the multimedia content: 39 animations in Video for Windows format explaining everything from echoes to internal combustion engines, as well as some 100 graphics (astronomical and geographical maps, illustrations, photos, charts, and tables) that don't appear in the print version. You even get a phonetics chart: Click any vowel or consonant to hear how it sounds.

McGraw-Hill Multimedia Encyclopedia of Science & Technology

MULTIMEDIA **Sophisticated reference CD ROM for libraries, scientific research labs, and businesses.**
McGraw-Hill Professional Book Group
800/233-1128 ext. 235, 717/794-2191, 717/794-5344 (fax)
List price: $1300
Reader service no. 681

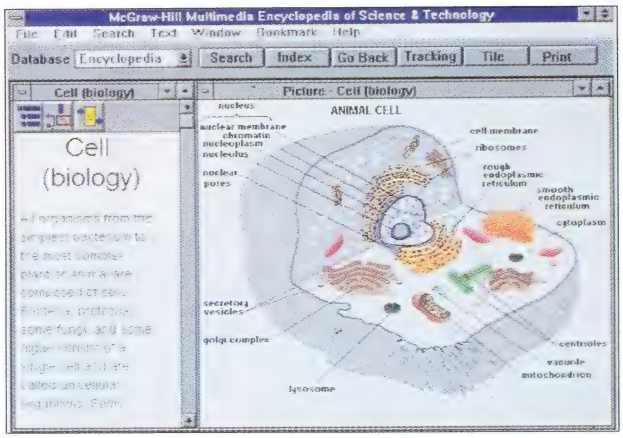
Aside from cost, the biggest advantage this CD ROM has over the print encyclopedia is its fast and easy search capabilities. Unlike many multimedia CD ROMs, the Science & Technology interface is streamlined for searching; you don't have to dig through gratuitous icons to find the information you need.

To perform a Quick Search, you type a single word or term, and up pops a list of relevant articles. Or you can choose Advanced Search, which uses Boolean logic: Type up to four related words or phrases to perform extremely specific searches. (For instance, you can search for articles in which your chosen words appear in the same paragraph.) When reading an article, you can click any highlighted technical word to receive a quick definition from the dictionary, or click an icon to view a related animation, illustration, or photo. Despite the depth and range of the encyclopedia's content, database searches are handled quickly and efficiently.

The most important element of any reference work, of course, is its content, and the Science & Technology disk doesn't scrimp on information. Although the explanations are fairly dry (after all, this *is* a technical reference), they are complete—you get 25 pages of text on the subject of volcanoes. Look up *compact disk,* for example, and you'll learn the speed at which audio tracks are scanned, the mathematical formula for acceptable dynamic range in audio, even the typical length of a disk's pits.

Network prices range from $1600 (for 2 to 8 users) to $1800 (for 9 to 20 users); annual updates of the Science & Technology CD ROM cost $325. You'll need 4MB of available hard disk space to install the program—but that's a small price to pay for the disk's wealth of information.

—James A. Martin



SCIENTIFIC LIBRARY ON A DISK: The McGraw-Hill Multimedia Encyclopedia explains everything from cell biology to cellular phones.

A Sound Choice for Presentations

The worst part of giving presentations is wondering whether your audience is about to doze off. Perhaps if you integrated music with text and graphics, your audience would be more receptive to your insights. Now you can do just that with Cambium Sound Choice, Volume One, a CD ROM library of 70 music clips created specifically for presentations. The musical selections are broad and include contemporary, classical, rock, jazz, and Latin or tropical riffs in slow, moderate, or upbeat tones.

The great thing about Sound Choice is that it lets you edit the clips. You control the timing, fade-outs, and crescendos of each 60-second clip. You can also use abbreviated "bumpers"—sound samples 2 or 15 seconds long. As you listen to each clip, type in comments via the Sound Choice interface so you can better remember the sound file at a later date.

Cambium Sound Choice, Volume One

MULTIMEDIA **Library of music clips for presentations.**
Cambium Development
List price: $69
800/231-1779
Reader service no. 682

The problem with Sound Choice is its selection of music. Although the disk's classical choices are impressive (they include Stravinsky, Dvořák, and Mozart), the other clips are generic and boring—your audience will feel as if they're riding in an elevator. The jazz selection needs someone like Miles Davis, and the rock choices could use Pink Floyd. Perhaps the music will improve in future Sound Choice volumes. Still, if you need to enliven your presentations, Sound Choice is a good place to start for $69.

—Arden M. Hoffman

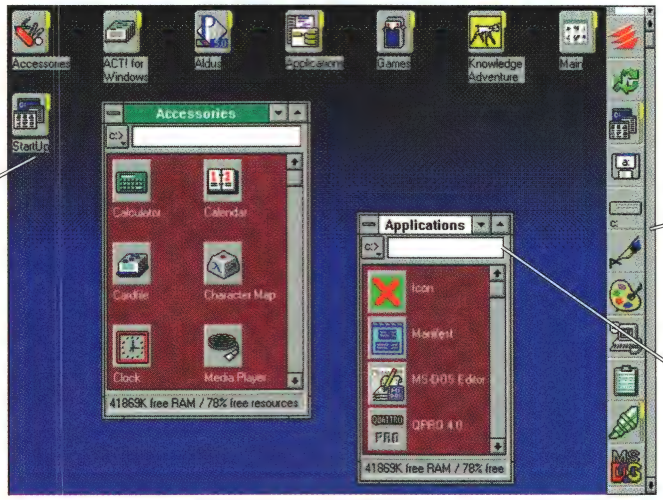
WONK

SideBar Wonks Your Windows to Perfection

SideBar eliminates the last bit of DOS clunkiness from MS Windows.

Object-oriented interface makes it easier to manage files, disk drives and printers.

Simply drag and drop files to copy, move or print them.



Now opening, copying, moving, deleting, renaming and printing are intuitive.

Speed up the way you work by customizing SideBar to conserve desktop space.

Sometimes prefer to key-in DOS commands? The command line's always there.

SideBar is the efficient desktop for Windows—a small, fast shell that automatically creates objects that make it simpler to manage applications, documents, folders, drives, TSRs, printers, etc. All you need to do is point and click.

SideBar simply makes Windows more 'windows-like.' And that makes your work go quicker and easier. It's an idea incorporated in Microsoft Office, but we've taken it to its obvious conclusion.

SideBar makes MS Windows a better place to work.

Quarterdeck

Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405 (310) 392-9851 Fax (310) 314-4219
Quarterdeck International Ltd., B.I.M. House, Crofton Terrace, Dun Laoghaire Co. Dublin, Ireland Tel.(353) (1) 284-1444 Fax: (353) (1) 284-4380

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Root canals. Bad haircuts. Business graphics. A few scary things you go through life trying to avoid. Well, fret no more friend. Visio™ is here. It's graphics software that gives you the courage to do things you've never done before. In a nutshell, it's business drawing for people whose business isn't drawing. What your spreadsheet does for numbers, Visio does for visual communication. With 20 stencils and over 600 pre-drawn SmartShapes™ to choose from, you'll be drawing all kinds of stuff without drawing one darn thing. Organizational charts. Project timelines. Computer network diagrams. Engineering schematics. The big word here is ENABLING. No other business graphics program lets you do so much, so fast

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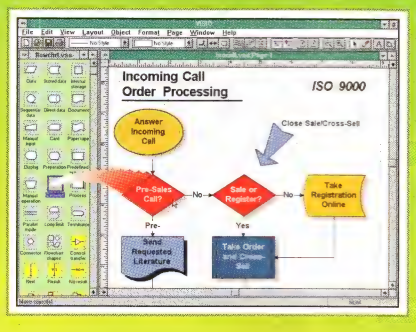

So you don't have a degree in rocket science? Using Visio is cake. Drag the pre-drawn SmartShapes from stencil to page. (In technical terms: Drag. Drop. Done.)

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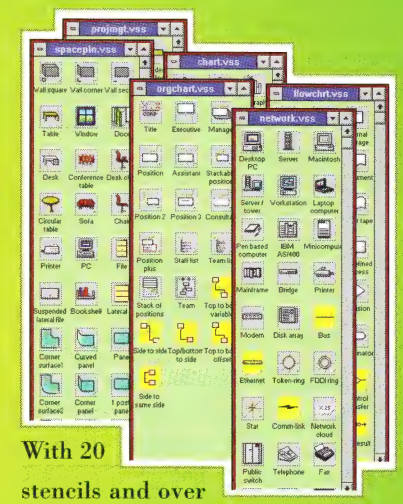
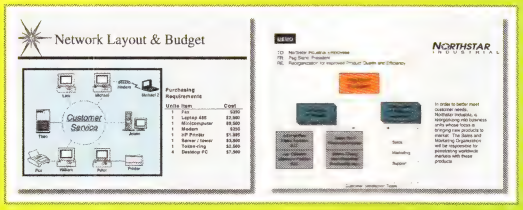
Visio and your Windows™ software. The perfect marriage. Visio has leading edge support for the OLE 2.0 standard. Which means you can put visuals into presentations, reports, spreadsheets, memos, and other office documents. It's a beautiful thing.



With 20 stencils and over 600 SmartShapes, you can draw project timelines, you can draw flowcharts, you can even draw maps. You can draw, draw, draw till it hurts.

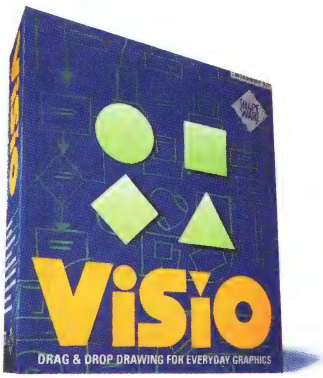
eat.



e afraid.

and with such reckless abandon. Drag it. Drop it. You got it. The moral of the story? Floss daily, spend a little extra on your next haircut and get Visio.

End the fear. Visio is just a mere $129. To order, call (800) 457-3335, ext. F22. Want more info? Call this number to get a free Visio Test Drive disk and the name of an authorized reseller near you.



Business drawing for people whose business isn't drawing.™

Circle 210 on reader service card

Omnifax G5: Five Peripherals in a Compact Package

It dices, it slices...well, actually, the Omnifax G5 doesn't do kitchen work. But the comparison to one of those multipersonality appliances isn't far off the mark. The G5 looks like a printer, but there's much more under the hood: It's actually a printer, scanner, copier, fax machine, and fax-modem. The unit weighs a hair more than 13 pounds and has a compact 11.7-by-8.8-inch footprint.

Multifunction peripherals are not new, but they have often been limited in functionality, and generally they cost about as much as you'd spend buying all the pieces individually. At $1995, the G5 certainly isn't inexpensive, but comparable features in individual units would easily clear your bank account of $3500 or so.

The heart of the Omnifax G5 is a thermal-technology, plain-paper printer that's HP LaserJet II (PCL4) compatible. The device prints up to 7 pages per minute at resolutions of up to 300 dpi. Faxes print at standard (100 by 200 dpi) or fine (200 by 200) resolution. The G5 also has a superfine (200 by 400) fax mode, although to use it you'll need to have a compatible fax device at the other end of the connection.

Omnifax G5

A multifunction device with printer, scanner, copier, fax machine, and fax-modem capabilities.
Omnifax
800/221-8330,
310/641-3690,
310/670-8578 (fax)
List price: $1995
Reader service no. 668

Omnifax has cleverly configured the G5 with the understanding that sometimes you need a standard fax machine, while at other times a fax-modem makes much more sense—for instance, when you want to fax directly from an application. As a result, you can use the G5's 14.4-kbps fax feature to scan, send, and receive paper-based faxes, or you can fire up the bundled Windows fax software to send or receive faxes via your computer.

Unfortunately, the fax software is not as full featured as some competing packages (such as the ubiquitous Delrina WinFax), and you can't use other fax products with the Omnifax G5. But basic capabilities, such as broadcast and delayed send, are included. There's also optical character recognition (OCR) for turning faxes into editable text.

The G5 can pat its high-tech head and rub its belly at the same time. For example, if you're printing or scanning a document when an incoming fax arrives, the G5 stores the fax in its internal RAM until the other task is completed. Another useful feature: The G5's built-in battery keeps it running (to receive faxes, for instance) for several hours during a power failure. There's even an optional carrying case, although the G5 is not exactly the type of accessory I'd take along with my laptop.

Sure, some of the Omnifax G5's individual features are compromises. For example, you can scan or copy only individual sheets. But overall, it's a nearly perfect peripheral for a small or home office.

—Stan Miastkowski

PACKED PERIPHERAL: The Omnifax G5 stuffs a printer, scanner, copier, fax-modem, and fax machine into a 13-pound desktop unit.

Wireless Messaging Made Easier

The AirNote Messaging System is a hardware-software combo that unites paging and Internet E-mail. The product consists of a standard 80-character alphanumeric pager and Windows, DOS, and Mac versions of Notable Technologies' SendNote software.

The $349 AirNote offers two ways to send wireless messages. Using SendNote, you create a message and dial an 800 number via your PC's modem, and your message is transmitted over SkyTel's national paging network to the recipients. Or if you have access to Internet, you can use your communications software to send messages to any AirNote pager—just add the @airnote.net suffix to the recipient's pager number. Another nice feature is the product's ease of use: I set up AirNote and was sending and receiving messages in less than 30 minutes.

Notable Technologies plans to introduce AutoNote, a software product that will set up your wireless pager as an E-mail in-box. You'll set priority levels and "include/exclude" filters to receive only urgent or desired messages via the wireless AirNote system.

—Gene Smarte

AirNote Messaging System

A pager and software system that enable you to receive critical messages away from your desk.
Notable Technologies
800/570-0000,
510/444-4493 (fax)
List price: $349, monthly service plan $39.95 to $124.95
Reader service no. 669

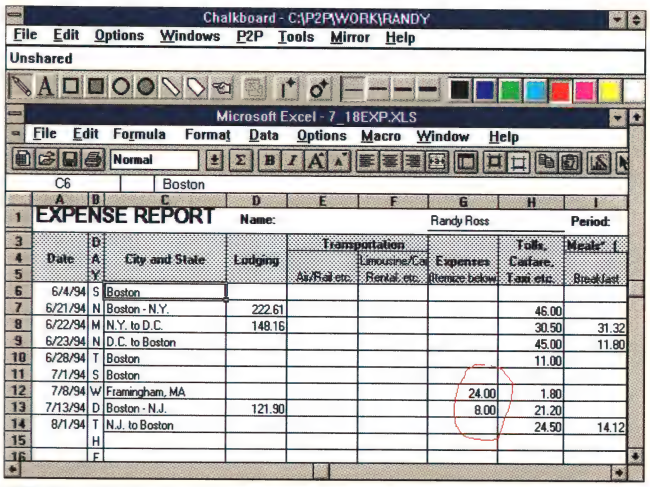
Share Documents With Co-Workers Across the Country

IBM's Person to Person for Windows document conferencing software lets you share short PC-based documents with associates around the corner or across the country. While you're connected, any items or annotations that appear on your screen also appear on their displays.

The product is one of the few in its class to provide *multipoint conferencing*. This feature allows you to share a document with up to eight people connected via LAN, modem, or both. (Some other products offer *point-to-point connectivity*, a feature that lets you connect to one other person via LAN or modem.) Using additional hardware, Person to Person offers limited video facilities, such as the ability to capture and share images from a video sequence. For example, you might want to take a snapshot of a new widget prototype and have an engineer discuss its features with your sales staff.

Although the connectivity features of Person to Person are unique, the product itself lacks certain refinements that make document conferencing easy. It can be tricky to install and use. Out of the box, it supports only a few modems. If your modem isn't one of them, you must retrieve the appropriate setup strings from a readme file. Many other programs support numerous modems without this hassle. Person to Person also makes it difficult to give multipage presentations, a key business use of conferencing software. And Person to Person lacks a "slide tray" feature to let you easily flip through presentation data stored as slides, a capability that some competing products include.

—Randy Ross



PERSON TO PERSON'S Chalkboard feature lets you mark up PC-based documents, such as spreadsheets, that you share with associates.

Person to Person for Windows

Powerful conferencing software, strong on connectivity but weak on ease of use.
IBM Personal Software Products
800/426-9402
List price: $99 through August, $280 thereafter

At Long Last, PCI LAN Adapters

While graphics cards for the PCI expansion bus appeared soon after the spec was published, PCI network interface cards (NICs) were nowhere to be found. But two ethernet cards that hit the streets recently have the distinction of being the first network adapters to go PCI.

This is good news for network users with PCI systems, who until now have had to use ISA or EISA network cards. PCI offers several advantages over these traditional buses: Its potential data transmission rates are faster than those of ISA or EISA. PCI supports burst-mode transfers and bus mastering by default. And PCI makes software configuration of add-in cards easy, which means less fussing with IRQs and DMAs when you plug the card in.

Boca Research's BocaLANcard-PCI is the more basic of the two new cards. It lists for $129—about the same as a standard low-end ISA NIC. The BocaLANcard-PCI works with 10Base-T and 10Base-2 wiring and ships with drivers for popular network operating systems, including NetWare (for DOS and OS/2 clients and NetWare 3.1*x* and 4.*x* servers), Windows for Workgroups, Windows NT, and Microsoft LAN Manager.

Cache Computers and Znyx are jointly marketing a second new PCI network card; Cache calls it the ZX312, and Znyx calls it the EtherAction ZX312. Both companies sell the card for $249 list, $120 more than the Boca Research card. So what do you get for the extra $120? For one thing, the ZX312 uses the DEC 21040 controller chip, while Boca uses an AMD chip. Cache and Znyx claim the DEC chip performs better than the AMD because it supports full duplex operation (meaning the card can send and receive signals at the same time). Also, the ZX312 comes with more network drivers than the Boca card (including software for Novell NetWare Lite and a host of UNIX environments). Finally, the ZX312 connects with 10Base-5 wires, in addition to the more standard 10Base-T and 10Base-2.

—Dan Miller

BocaLANcard-PCI

Low-priced ethernet adapter for the PCI bus.
Boca Research
407/997-6227
List price: $129
Reader service no. 670

ZX312/EtherAction ZX312

Higher-priced, feature-rich PCI ethernet adapter.
Cache Computers
510/226-9922
Znyx
510/249-0800
List price: $249
Reader service no. 671

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BUT OUR TAPE DRIVES MAKE PROTECTING YOUR PERSONAL DATA EASY.

Your hard drive's nearly full, and you still have files to back up. This time, forget the hassles of difficult backup storage. And try an Iomega tape drive.

A simple choice, considering you can install the drive in four quick steps. There's no extra hardware or software to buy. And operation is so easy, backing up a single file or your entire hard disk is a breeze.

It's the only drive that will read QIC or Irwin tapes. It lets you work in DOS, Windows or OS/2. And performance? It's up to 60% quieter and uses 25% less power than other drives. And it's backed up by the only 5-year warranty in the business.

Iomega tape drives. They'll bring an easier personal storage solution to your attention. Call Iomega at 1-800-289-4033 for the computer dealer nearest you. And please, pardon the interruption.

IOMEGA®

Circle 152 on reader service card

PCvoice Assist

PCvoice Assist is a $249 digital recorder that is particularly handy for notebook users. With its compact, streamlined design, high-quality microphone and speaker, and innovative software, it may create a market niche. Plug it into your portable's serial port to play WAV files during presentations, record a meeting, or simply organize your thoughts. Bundled software lets you embed a voice comment in a spreadsheet or word processing file, arrange and search voice notes by subject, or create a voice-enriched Windows tutorial. At least that's the way it all works in theory. When we tried to record a meeting, PCvoice Assist quickly crashed—a problem that the company attributed to a quirk in Windows for Workgroups 3.11. (However, the company sent a new DLL file that solved the problem.) PCvoice, 404/343-8201, 404/442-3156 (fax).

Reader service no. 700

Multimedia Cloaking

This inexpensive utility from Helix Software saved a computer here at *PC World*. After installing a CD ROM drive and a sound card on a system running Windows for Workgroups and NetWare, only 522K of conventional RAM remained free—Windows wouldn't run properly. Then we installed a prerelease copy of Multimedia Cloaking and got a usable 595K.

What happened? Multimedia Cloaking contains variations on three typical multimedia TSRs: a mouse driver that was developed with Logitech, a disk cache that supports CD ROM drives, and a version of Microsoft's CD ROM–controller program, MSCDEX. Since these programs load into extended memory, they free blocks of conventional RAM and upper memory for other uses. Multimedia Cloaking has a list price of $39.95 and works with a variety of memory managers, including DOS's EMM386 and Helix's NetRoom. Helix, 800/451-0551, 718/392-3100, 718/392-4212 (fax).

Reader service no. 701

The Norton DiskLock Series

Whether you use a stand-alone PC or a sophisticated network, you can limit access to sensitive material using the Norton DiskLock Series. Norton DiskLock 3.0 is for single users; Norton DiskLock Administrator 3.0 is for networks. You can assign varying levels of security: Password protection requires a password before booting, even from a floppy; file locking lets you password-protect complete directories or file groups; and DiskLock's file encryption uses either a proprietary technique or the federal government's DES standard. DiskLock 3.0 lists for $129; DiskLock Administrator lists for $1161 for a ten-user license. Symantec Corp., 800/441-7234.

Reader service no. 702

NEC SilentWriter 610

How low can a 600-dpi laser printer go? NEC's 6-ppm SilentWriter 610 recently underwent a user-friendly $100 price reduction and should sell for under $500 on the street. By designing and building its own print engine, NEC has boosted the price-performance standard for laser printers. According to the company, the SilentWriter's GDI (graphical device interface) technology converts Windows' graphics language directly into dot graphics. The result is faster printing—particularly on the first page of a print job. NEC Technologies, 508/264-8000.

Reader service no. 703

PCVOICE ASSIST is a $249 hand-held digital recorder with a built-in microphone and speaker—particularly handy for notebook users.

Oogler Universal File Viewer

Oogler 1.0 for Windows is billed as a universal graphics file viewer, enabling you to display 23 raster and 11 vector graphics formats from a Windows environment. You can view images three ways: by using Oogler's menu or graphic button bar; by double-clicking an image file in File Manager; or by dragging and dropping an image file from File Manager onto the Oogler icon. You can view multiple images simultaneously and zoom and pan to examine details. Oogler 1.0 lists for $37.50. Inset Systems, 800/828-0068.

Reader service no. 704

LabelWriter XL and XL Plus

CoStar's newest label printers, the LabelWriter XL and XL Plus, print at 203 dpi—that's almost twice the resolution of CoStar's previous offerings. The new LabelWriter XL models also have built-in network support for NetWare (versions 3.11 and higher), LANtastic, and other Windows-compatible networks. CoStar bundles DOS and Windows software for designing label templates. The software lets you store contact information in address books, which are searchable and useful for mass mailings. The LabelWriter XL prints standard address, file folder, and small labels. The XL Plus accommodates larger shipping and 3½-inch floppy labels. CoStar also sells custom-size labels and those preprinted with special markings such as a company logo. The LabelWriter XL costs $249.95; the XL Plus is $299.95. CoStar Corp., 800/426-7827, 203/661-9700.

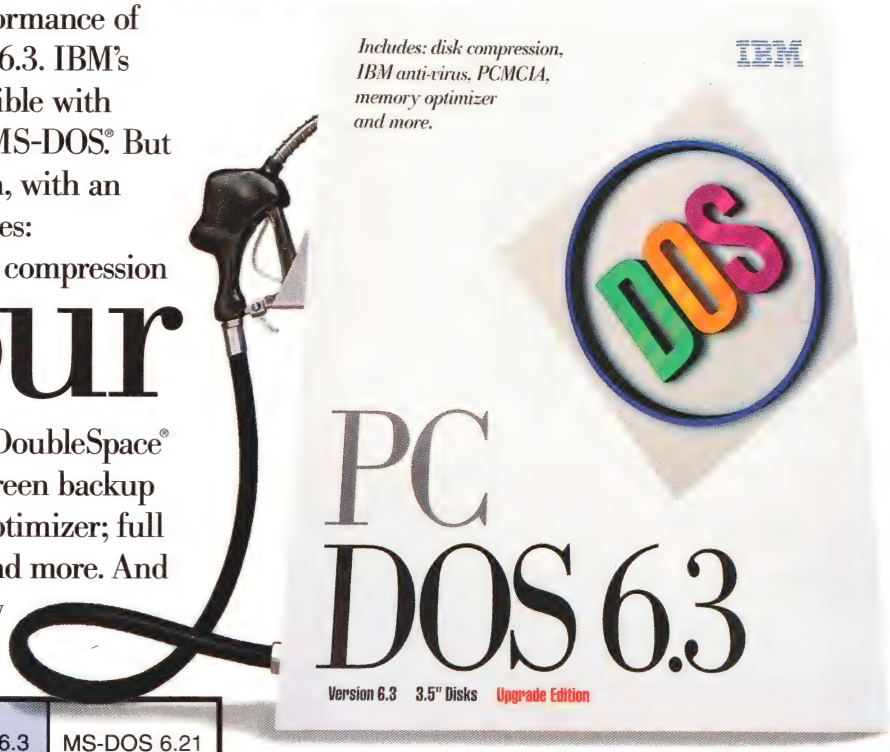
Reader service no. 705

ProdeaSynergy 2.0

Thanks to OLE 2.0 support and to process logic enhancements, the new version of this visual programming tool has more power to automate repetitive business tasks. ProdeaSynergy automates tasks such as producing a monthly report by bringing together DOS and Windows programs and information stored on a LAN or mainframe. To create this application "package," you use Pro-

High octane for your

Want to pump up the performance of your PC? Fill 'er up with PC DOS 6.3. IBM's award-winning PC DOS is compatible with previous DOS versions, including MS-DOS.® But PC DOS 6.3 delivers more function, with an unmatched range of built-in utilities: IBM AntiVirus; integrated compression technology that's safe, fast and DoubleSpace® compatible; Central Point®'s full-screen backup including tape support; memory optimizer; full screen editor; CD-ROM support and more. And to top it all off, PC DOS will really get your Windows™ whirring.



WHAT'S UNDER THE HOOD?	PC DOS 6.3	MS-DOS 6.21
Integrated compression.	YES	NO
Dynamic memory optimizer.	YES	NO
Number of viruses that can be detected.	2000	800
Full-featured backup support.	YES	NO
Program scheduler.	YES	NO
PCMCIA and Pen support features for mobile users.	YES	NO

With PC DOS 6.3 under the hood, you can shift your hardware *and* software into high gear.

To order or to find out more, call 1 800 342-6672.

In Canada, call **1 800 465-7999.** PC DOS 6.3 is also available at local software dealers.

PC.

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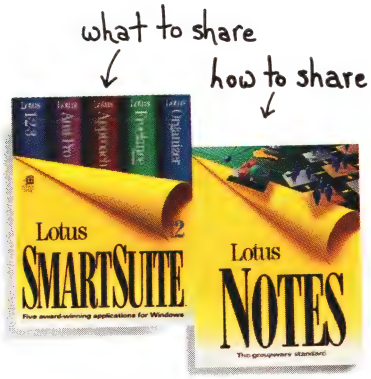
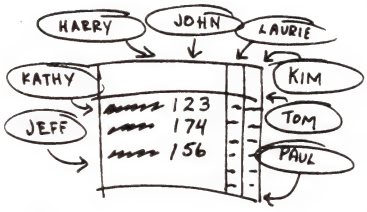
O.K., you've got your own personal vision. And this other guy, he's got his own personal vision. And so does everyone else in your workgroup.

Well, we've got these five software products that work like one and let you and your colleagues and co-workers and people you haven't ever even met do the same. Hey, find the right way to work together, there's no telling what you can do.



Even though sometimes it seems like you're in it alone, you know that you rely on the people around you and that ultimately nothing gets done without teamwork. So it makes sense that your software should help this process, not stand in the way.

That's why Lotus® SmartSuite® is designed for workgroups, not just individuals. SmartSuite is five Windows™ applications–1-2-3,® Ami Pro® word processor, Approach® database, Organizer™ personal information manager and Freelance Graphics®–fully integrated to work together, and enabled with powerful workgroup features to help co-workers do the same.



Version Manager technology lets many people work on the same document. Add Notes and they can do it at the same time.

For starters, each application shares a consistent look and feel. Everything works the way you expect it to, so if you've learned one application, you won't spend a lot of time learning the others.

Smarter than the other suites

SmartSuite has many productivity features you just can't get anywhere else. Like Collect and Copy which lets you take multiple data ranges from any number of 1-2-3 spreadsheets and bring them into an Ami Pro document with a single click, setting up a live OLE link at the same time.

Lotus SmartSuite moves beyond integrating applications to integrating workgroups through built-in technologies like Version Manager™ which lets workgroup members work on

*$299 promotional price available while supplies last. **In Canada call **1-800-GO-LOTUS**. Prices may vary. ©1994 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus, Working Together, 1-2-3,

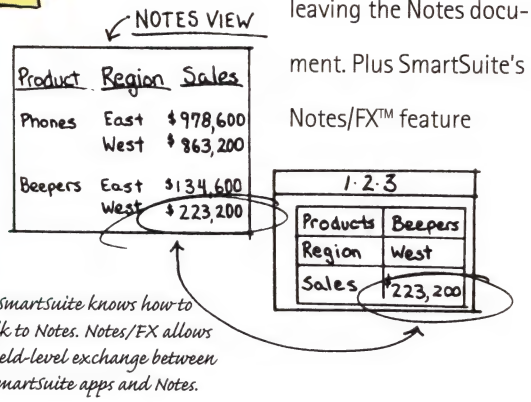
the same file concurrently,

adding their insight without creating confusion.

Notes takes it to the next level

And to really experience the power of Working Together,® combine SmartSuite with Notes,® the groundbreaking groupware from Lotus. Right now almost 750,000 people in more than 3,000 companies are using Notes to access, track and share data in ways never before possible.

Now you can harness the power of SmartSuite's individual applications from within Notes, using 1-2-3's power to crunch numbers, Ami Pro's facility with words or Freelance Graphics' presentation capabilities – without leaving the Notes document. Plus SmartSuite's Notes/FX™ feature



automates the exchange of information between the desktop apps and Lotus Notes. The bottom line is a better level of communication – more complete and more accurate than ever before.

Look into SmartSuite. A SmartSuite upgrade costs **$299.*** Just call **1-800-TRADE-UP, ext. 9867.**** The time you save will be your own.

Lotus
Working Together®

Ami Pro, Freelance Graphics, Approach, SmartSuite and Lotus Notes are registered trademarks and Version Manager, Notes/FXand Organizer are trademarks of Lotus Development Corporation. Windows is a trademark of Microsoft Corporation.

deaSynergy to choose icons for the programs, then draw arrows between them to represent the work flow process. You do specify which pieces of information will be used (for example, what Excel file you'll use). Process logic enhancements let you build more complex rules regarding how and when to execute applications. ProdeaSynergy costs $495; a ten-user LAN license is $4500. Registered users can upgrade for free. Prodea Software Corp., 800/776-3321, 612/942-1000.

Reader service no. 706

Polaview LCD Panels

Polaroid has introduced three LCD projection panels, the company's first. The $6695 Polaview 3000 is an active-matrix panel designed for multimedia presentations. Capable of displaying 24-bit color, it includes built-in speakers and inputs for NTSC, PAL, and SECAM video signals. The Polaview 1800 is a no-frills active-matrix panel listing for $4995; it displays up to 2.1 million colors but lacks the sound and multisignal capabilities of the 3000. Finally, the $3495 Polaview 1500 includes a passive display capable of displaying 256,000 colors. All three panels ship with a wireless remote control. Polaroid Corp., 800/225-1618.

Reader service no. 707

Minuteman PowerMind

The Minuteman PowerMind series of uninterruptible power supplies include on-board microprocessors and communications ports, allowing them to interact "intelligently" with your local area network server. If you are plagued by low-power or power-spike situations, the PowerMind regulates the power delivered to your network server. If there's a power failure, the products (when paired with appropriate software such as Minuteman LanMaster) can gracefully shut down your LAN, locking out new log-ins and prompting users to save work in progress. After a power failure, the PowerMind models provide up to 25 minutes of juice for up to ten PCs or file servers. Additional battery packs can extend backup times up to 3 hours. Prices range from $499 to $1729. Minuteman UPS, 800/238-7272.

Reader service no. 708

Jurassic Park, The Screen Saver

If a cuddly purple Barney isn't your idea of a real dinosaur, or if you're just plain bored with Windows' limited selection of screen savers, tromp on down to your local software store and unearth Jurassic Park, The Screen Saver. The floppy disk version features film and sound clips from the motion picture. The CD ROM version adds even more clips, as well as outtakes. You can also assign dinosaur sounds to certain events, such as starting or closing Windows or receiving E-mail. Just one caution: Keep the sound low; your co-worker might be trying to get something done. The floppy version lists for $19.95; the CD ROM version is $34.95. Asymetrix, 800/448-6543.

Reader service no. 709

Sound Blaster AWE32

In the increasingly confusing and competitive sound card market, Creative Labs, the current leader, is upping the ante with the Sound Blaster AWE32. With a surprisingly low price of $399.95, the AWE32 is an extension of the Sound Blaster 16 ASP. It offers many features found in expensive professional audio boards, making it ideal for musicians and multimedia developers on a budget. The *AWE* stands for Advanced Wav-Effects, a function of the EMU8000 digital signal processor included on the card. Instead of the usual wave-table sounds stored in ROM, AWE uses downloadable sounds (included in the AWE32) that deliver better quality and can be upgraded easily. The AWE32 has 4MB of RAM for sound storage and can be upgraded using standard SIMMs. The 16-bit AWE32 records and plays CD-quality audio at up to 44.1 kHz and has an on-board interface for Sony, Mitsumi, and Creative Labs CD ROM drives. Bundled software includes text-to-speech and speech recognition, Qsound Virtual Audio for 3-D sounds, and CakeWalk Apprentice MIDI sequencer. Creative Labs, Inc., 800/998-5227, 408/428-6600.

Reader service no. 710

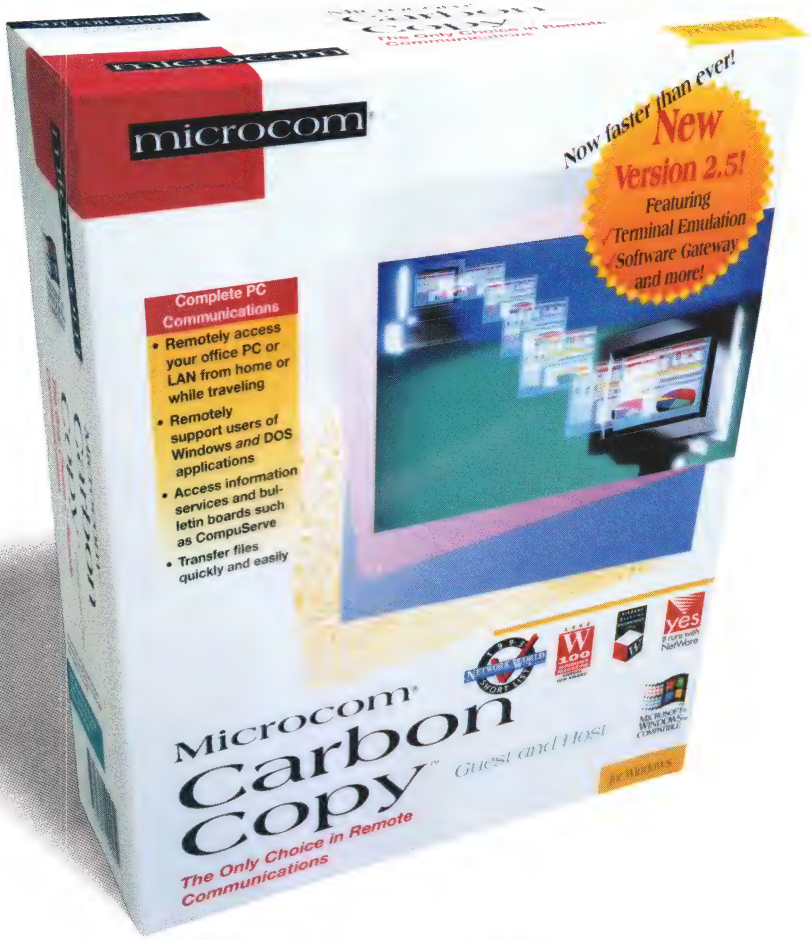
THE JURASSIC PARK SCREEN SAVER brings bygone behemoths to your screen and even lets your computer make dinosaur noises.

Intersolv Q+E

Q+E used to be a simple data query tool: easy to use, able to access many kinds of data, but limited in its capabilities. Q+E Software, now a subsidiary of Intersolv, is rolling out a far more powerful version. With Intersolv Q+E, you build a query via menus or a dialog box, then view and edit the SQL statement created by your query. You can also chart your data. Q+E's drill-down feature lets you run other queries when you click a cell on the program's spreadsheetlike answer sheet. Other features include a band-oriented report writer, mail merge capabilities, and a scheduler that lets you do complex queries at 2 a.m. when no one's around to complain that you're hogging the network. And if your company's database experts are nervous about giving users too much power, they can limit access to specific Q+E features. Intersolv Q+E should be available for a list price of $499 by the time you read this. Intersolv, 800/876-3101.

Reader service no. 711

For more information about any product, contact the manufacturer or circle the number on the reader service card.



INTRODUCING REMOTE EVERYTHING: NEW CARBON COPY 2.5

It can happen anywhere: at home, in your hotel room, an airport lounge, while you're overseas. Suddenly you've got to get at a file, access e-mail—maybe even run a program—that's in the PC back at your office.

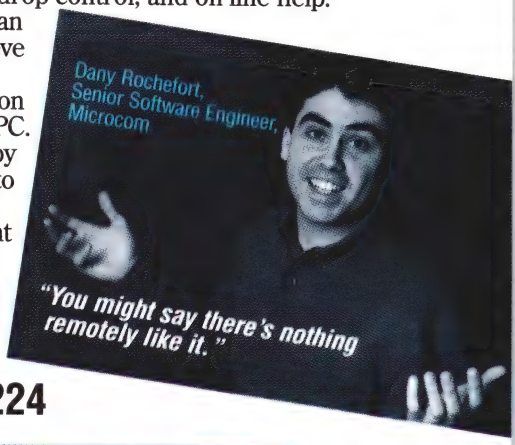
Now there's a total remote-communications package that lets you do it all, faster than ever. Microcom's new Carbon Copy™ 2.5 offers you easy access and complete control of the files, applications and peripherals of another PC or LAN, no matter where you are.

With its new software gateway you can dial into a single LAN modem and access any PC on the network (ideal for small offices). A built-in terminal emulator allows direct access to on-line services like CompuServe®, and electronic bulletin board systems (BBSs). And Carbon Copy 2.5 supports leading file transfer protocols—no need for additional communications software.

A true Windows application, Carbon Copy 2.5 runs effortlessly, right out of the box. With simple point-and-click, drag-and-drop control; and on-line help. What's more, you can now send and retrieve files between PCs, whether or not Carbon Copy is on the host PC.

New Carbon Copy 2.5: when it comes to fast, easy remote access, we've thought of everything. For free information and the name of your local Microcom dealer, phone

1-800-822-8224



All-In-One Remote Communications

Integrated Terminal Emulator

Remote Control

File Transfer

Software Gateway

Remote Clipboard

Also check out Microcom's 28.8 DeskPorte™ *FAST* and TravelPorte™ *FAST* high-speed modems.

Upgrade to Carbon Copy 2.5 for only $49

Now for a limited time, upgrade to Carbon Copy 2.5 from any competitive remote communications software, or any version of Carbon Copy, for only $49. Call today: 1-800-765-1750.

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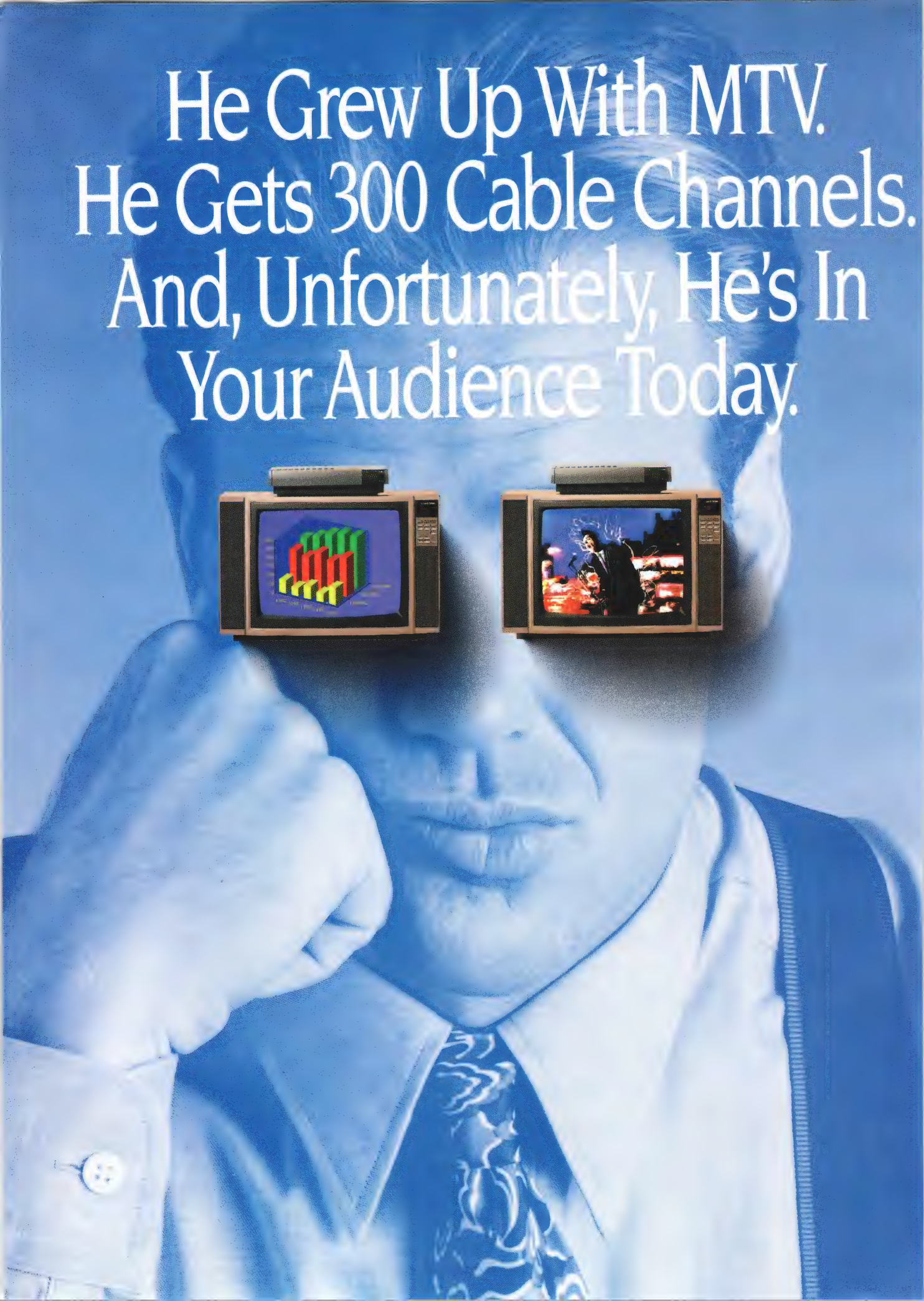
Circle 157 on reader service card

He Grew Up With MTV. He Gets 300 Cable Channels. And, Unfortunately, He's In Your Audience Today.



Introducing Z·NOTEFLEX™, The Ultimate Multimedia Presenter.

Audience attention spans are short. And if they snooze, you lose.

So what you need is a way to connect with them, a way to make your presentations really worth watching. The versatile, new Z-NOTEFLEX system, from Zenith Data Systems, is sure to keep them wide-eyed and endlessly entertained.

With the Z-NOTEFLEX system, you get all the capabilities of a multimedia workstation built around a powerful notebook computer. So, not only can you take the show on the road, you can carry it around in your hand.

Inside the Z-NOTEFLEX, a high-speed Intel 486 processor and a fast local bus deliver sharp, 256-color images and full-motion video that are sure to get attention. Particularly when the LCD display is detached and positioned in your viewers' direction.*

And, of course, no multimedia-ready system is complete without a CD-ROM drive.**

Video, however, is only part of the picture. Because with built-in, 16-bit audio, a microphone and stereo speakers, the Z-NOTEFLEX system is truly (pardon the expression) a sound investment.

Z-NOTEFLEX
up to
IntelDX4™ 75MHz processor
16-bit business audio
active-matrix, 256-color
LCD display

FLEXSITE
LCD display stand

FLEXBAY
battery charging bay
floppy drive bay

FLEXDOCK
enhanced port replicator
two type-III PCMCIA slots
networking module

FLEXSHOW†
double-speed CD-ROM drive
amplified stereo speakers
two type-III PCMCIA slots
integrated power supply

Modularity is another attribute of the versatile Z-NOTEFLEX system. The notebook's processor, memory, drives and display are all user-upgradable. And optional FLEX modules and PCMCIA slots support a wide range of system enhancements, multimedia and peripheral solutions.

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Circle 192 on reader service card

FIRST LOOK Windows

MY COMPUTER. Starting point for getting at your drives, folders, printers, and other peripherals.

INSIDE MY COMPUTER. Where you go when you double-click the My Computer icon. Double-click folders or icons to drill down further.

EXPLORER. A vastly improved version of File Manager. And yes, it supports long names for files and directories.

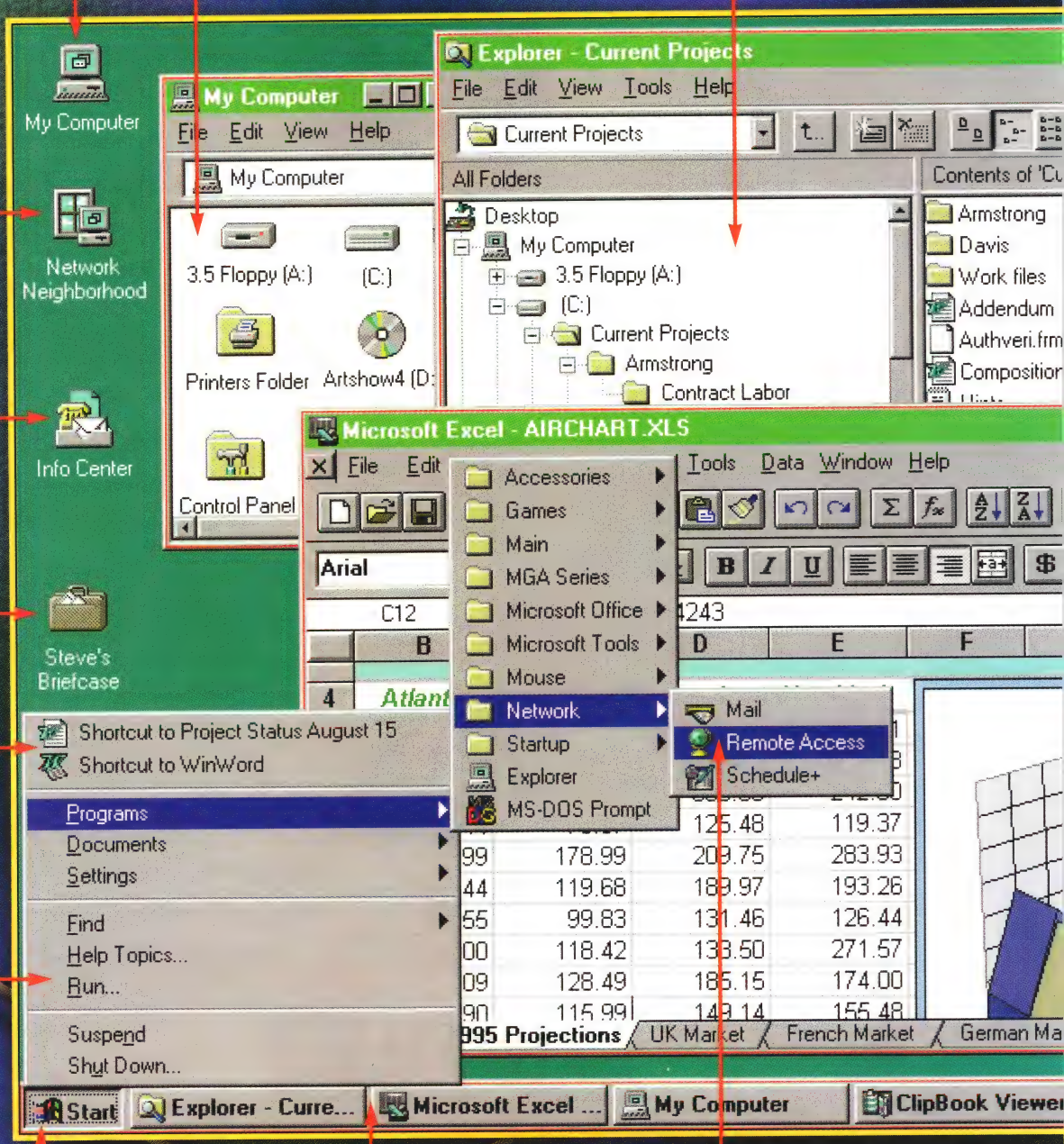
NETWORK NEIGHBORHOOD. Provides graphical point-and-click access to your network.

INFO CENTER. A central place for storing and accessing E-mail, faxes, and voice messages.

BRIEFCASE. Drag-and-drop file updating keeps the files on your mobile and desktop PCs in sync.

SHORTCUT. Drag an icon onto the Start button or the desktop and click your way directly to an app or file.

START MENU. A no-brainer program launcher with access to help, a slick search utility, a command line, and more.



START BUTTON. One click brings up the Start menu, offering an entrée to your most common tasks.

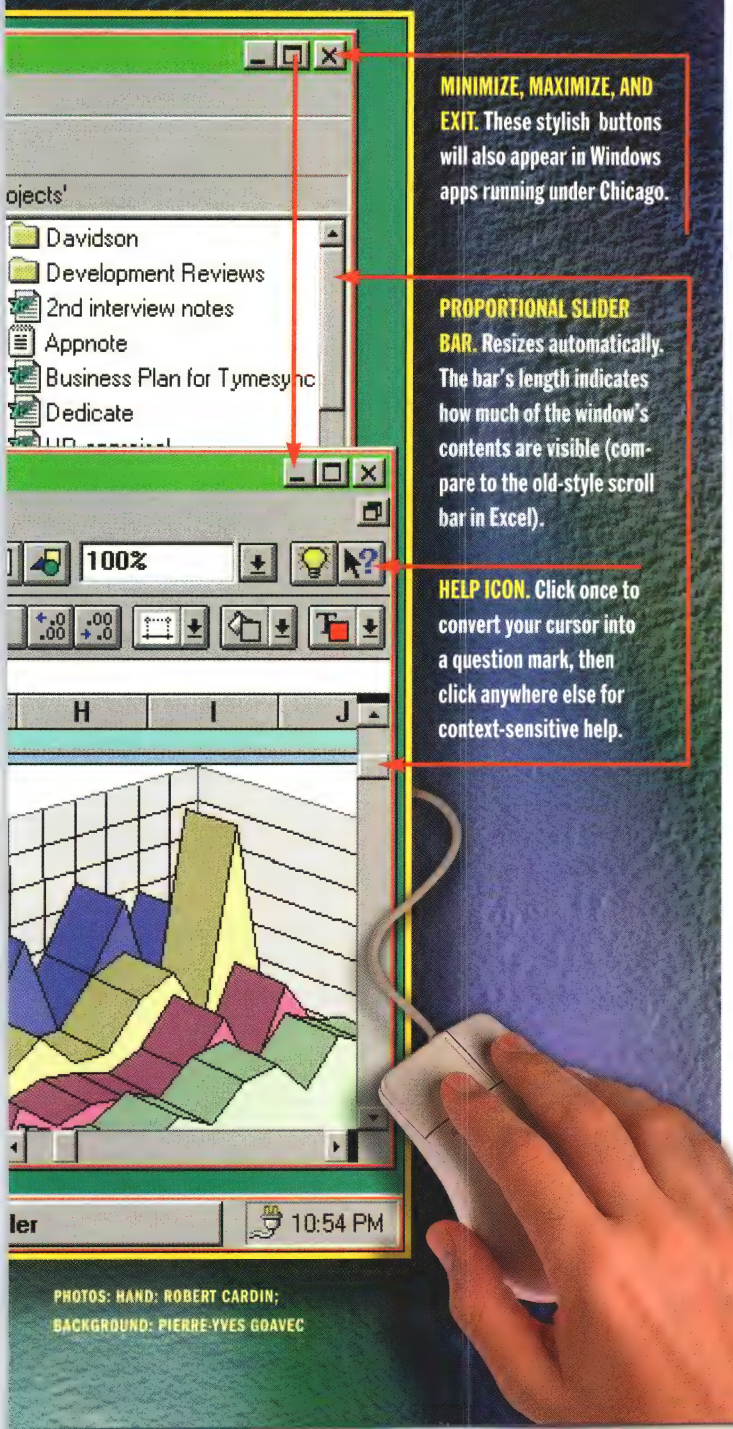
TASKBAR. Displays active applications and files. The customizable bar allows push-button task switching.

REMOTE ACCESS. Lets mobile users hook into the network back at the office.

4.0

IS THIS THE WINDOWS YOU'VE ALWAYS WANTED?

By Steve Fox



PHOTOS: HAND: ROBERT CARDIN; BACKGROUND: PIERRE-YVES GOAVEC

A show of hands, please. What irks you most about Windows 3.1? Its confusing interface? The frequent crashes? Being forced to scurry off to Program Manager, File Manager, or Print Manager to perform everyday operations? None-too-well-disguised DOS, lurking just beneath the graphical surface? Incomprehensible file names?

Okay, hands down. Your complaints are about to be addressed. With the expected late '94 or early '95 release of Chicago—Microsoft's code name for the next version of Windows—we're finally getting the Windows we've always wanted.

"Chicago's not a step forward—it's a leap forward," proclaims beta tester J. Briscoe Stephens, of the Space Sciences Laboratory at NASA's Marshall Space Flight Center in Huntsville, Alabama. "It's a chance to soar with the eagles."

Coming from a rocket scientist, this raises an obvious question: Do you need to be a rocket scientist to use it? After days of poring over, pummeling, even crashing a prerelease version of Chicago, I'm prepared to answer with an emphatic no. I found Chicago easier to use, easier to navigate, and easier to learn than its predecessors. It's handsomer, too, with beveled 3-D surfaces; slick-looking buttons and icons; and cleaner, modern-looking typography. It has more features,

including support for long file names; quick-access menus for files and peripherals; improved help; and built-in communications, networking, and mobile computing tools. There's a handy file viewer, Plug and Play support, and new multimedia features such as Video for Windows. Chicago also promises better performance for today's Windows apps, preemptive multitasking for 32-bit apps, and a more stable computing environment than its predecessor. While adding all this, Microsoft also removed some nasty thorns: DOS, AUTOEXEC.BAT, and CONFIG.SYS are out of sight; Windows' File Manager and Program Manager are banished.

The new features' breadth is matched by their usability; Chicago looks to be a marvel of flexibility. Novices can accept the various default settings, taking the beaten path through the interface, while PC veterans will chart their own courses, seeking paths better suited to their work styles.

Top 10 Reasons to Upgrade

Improved interface
Program Manager and File Manager are out. My Computer, Explorer, and Start make finding data a point-and-click affair.

CONFIG.SYS, AUTOEXEC.BAT—Not
Well, they're still there, but so well hidden you'll never have to worry about them again.

Long file names
Eight dot three no more. Anything goes now.

Clever right mouse button
Right-click anywhere to bring up a context-sensitive menu.

Preemptive multitasking
A new order governs your applications, and a 32-bit architecture provides performance and stability.

Plug and Play
IRQs got you down? Windows instantly recognizes Plug and Play cards and peripherals. Plug in and get on with your computing.

Three-fingered salute
If an application hangs, shut it down without rebooting Windows.

Shortcuts
Easy-to-create icons provide quick access to files or applications.

Mobile computing
Drag and drop files into your Briefcase folder for quick portability and file synchronization when you return.

Communications
Remote network access, TCP/IP support for interactive Internet connections, and a NetWare client are all standard.

It Starts With Start

Starting a Chicago PC is like turning on a toaster: Just hit the button. Sure, you'll still see BIOS information and other machine-specific hieroglyphics scroll by, but far fewer than under Windows 3.1. And then, instead of pausing at the nasty old C> prompt, your PC will charge directly into Chicago's Desktop. At the bottom left, your eyes are immediately drawn to a button emblazoned with the Windows logo and the word Start. I say *drawn* because an arrow attached to a text message—"Click here to begin"—floats in from the right, gently bouncing off the Start button. This pervasive cuteness gets stale in a hurry, but new users will never be left wondering what to do next.

The click brings up a menu of choices, including Programs, Documents, Settings, and Help Topics. Moving the pointer over Programs summons a secondary menu. Suddenly you're looking at a listing of your Folders (back in the semigraphical days of early '94, we called these things directories). Pass the pointer over a folder, and out to the right shoots another menu, this one listing all the applications, files, and subfolders within that folder. A click activates the desired application or, if you're cruising the Documents menu, loads a file. Especially pleasing: You needn't keep your finger on the mouse as you peruse the menus. Passing the pointer over an item brings up the next logical menu, and the previous menus remain on screen until you click your destination.

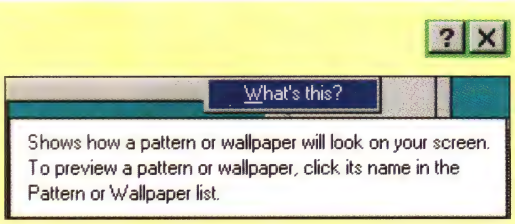
Chicago's Start button can lead you anywhere you want to go. The Settings menu takes you to basic maintenance areas, most notably Control Panel, where you can change your display resolution on the fly, install a new Plug and Play peripheral, alter your mouse settings, and perform all of the other nitty-gritty functions that keep Windows humming. Start•Find lets you comb your hard disk for files or folders or your network for other computers, while Start•Run gives you a command line similar to Windows 3.1's File•Run. And DOS and Windows veterans comfortable with the concept of a directory tree will love Explorer, which is accessible from the Start button's Programs menu. Explorer is what File Manager was supposed to be—a fully drag-and-drop-enabled storage and organization center that lets you view, launch, and otherwise manipulate files. As a 3.1'er from way back, I immediately recognized Explorer as the best way to adventure in the file jungle.

Have It Your Way

You say you hate directory trees, you found Windows 3.1's File Manager intolerable, and you think Start buttons belong on dryers, not operating systems? For you, Chicago offers the Desktop—what the Windows 4.0 Help file portentously calls the "root of everything." Indeed, if you look in Explorer, you'll note that the Desktop

It's About Time...

Helpful help. Click the question mark, then click anywhere to activate context-sensitive help. Or right-click an object to bring up a What's This? text box.



For NASA's J. Briscoe Stephens, Chicago offers "a chance to soar with the eagles."

appears as the top level of Chicago's hierarchy. When Chicago boots, you'll see icons for My Computer and (if you're connected to a network) Network Neighborhood. Double-click My Computer and you'll get a window showing all your drives (floppy, hard, CD ROM, and so on), plus icons for Control Panel and Printers Folder. A double-click of your C: drive icon brings up a window of all that drive's contents. Further double-clicks allow you to drill down to files or applications you want.

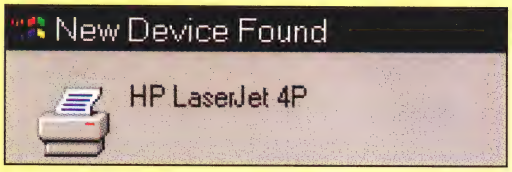
Of course, this sort of compulsive double-clicking will eventually fill your screen with more open windows than a city bus without air conditioning. But again, you have choices. From the View menu you can cut down on clutter by having each new window replace the succeeding one. A single click on a toolbar icon retraces your steps one window at a time. While you're at it, you can view files as a collection of large icons, small icons, a filename list, or a list with full details. And naturally, a double-click on a file name launches the file in its associated application.

Network navigation follows a similar double-clickety course, even if the Network Neighborhood icon imparts a certain "Mr. Rogers" feel to the proceedings. The neighborhood, by the way, refers to any PCs in your work group; you attach yourself to machines in other work groups by double-clicking the Entire Network icon. Finally, there's a graphical way to browse the network without having to join MIS.

Alongside the default icons, the Desktop supplies plenty of room for your own icons. Is there a document you work on every day, a printer you access regularly, an application you want to get to quickly? Drag the appropriate icon from a window or from Explorer onto the Desktop, double-click, and jump directly where you want to go. Even better, right-drag the icon to the Desktop, and you'll get a choice to copy, move, or create a Shortcut (a pointer to a file).

For NASA's Stephens, the customizable Desktop is Chicago's most compelling feature. "Day in and day out, users do the same things. The Chicago Desktop lets me get at the tools I need. It's click and drag, and I'm ready to go, with any app on screen when I boot. If I can save a minute a day, over the lifetime of a PC that's probably a

It's About Time...



Plug and Play. If a peripheral supports the new Plug and Play spec, Chicago will configure its settings behind your back.

An Upgrader's Guide to Windows 4.0

After I saw Windows 4.0, I knew I had to upgrade. *Now*. Then I remembered my experience with Windows 3.0. It took me months to feel comfortable leaving the familiar DOS confines of my XyWrite word processor. Without a command line, I felt as though I had lost my fingers. Will relocating to Chicago leave you feeling similarly incapacitated?

No, the move should be easy. And cheap: Upgrades should cost less than $100 on the street, and a CD ROM version is planned that would speed up the installation process. You will, however, need at least a 386 with 4MB of RAM, according to Microsoft; we suggest a 486 with 8MB if you want to achieve practical productivity. You'll also be best prepared to take advantage of Chicago's Plug and Play features if your PC has a flash BIOS, so that it can be upgraded with software.

The setup process is also easier than in 3.1. It is graphical from start to finish, and a series of gauges and pop-ups will keep you apprised of the installation progress. The most important change to setup, however, occurs behind the scenes, as Windows checks your system's configuration; this step is essential if Plug and Play is to succeed. During this phase Chicago determines what peripherals and components are installed and what resources—IRQs, I/O addresses, and DMA channels—are in use. If you've got a Plug and Play BIOS, you may have an advantage here, since most of this information should already be stored in the BIOS. If not, you may find yourself answering a lot of questions.

Next, Chicago determines which system components you want to install, upgrades your version of Windows, replaces DOS, and, with your help, configures your peripherals.

Once Chicago is installed, expert Windows users will be able to use all the familiar hotkeys. You'll find File Manager's tree-structure approach to file organization easy to duplicate in Explorer.

One warning: If you've fallen for a Windows front end such as The Norton Desktop or HP's Dashboard, you'll have to either discard that comfortable blanket or wait for a new version. Microsoft says Windows 3.1 replacements will not run on top of Chicago.

—Russell Glitman

RIGHT: PIERRE-YVES GOAVEC; ABOVE: MIKE CLEMMER

The Windows Challenge: Microsoft vs. Apple vs. IBM

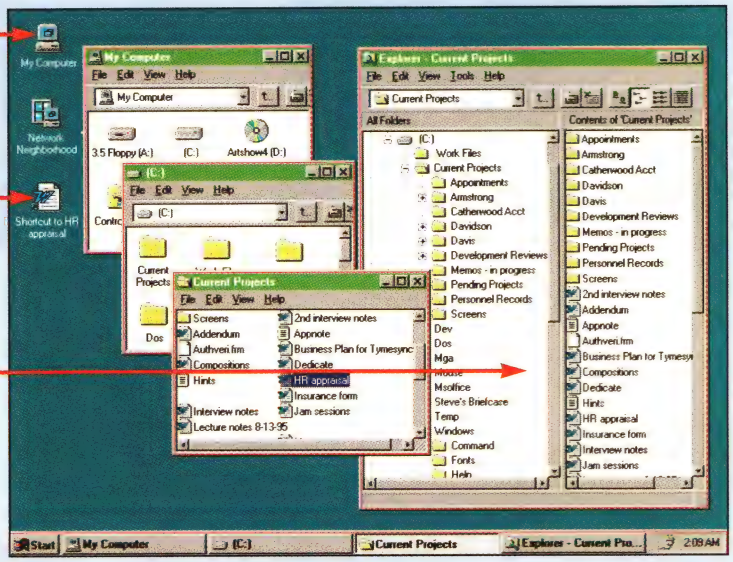
If imitation is the sincerest form of flattery, Apple ought to have a swelled head. In creating Chicago, Microsoft seems to have borrowed liberally from Macintosh's System 7 graphical user interface (GUI). But Chicago's no mere Mac copycat—it's packed with new touches, elements from IBM's OS/2, and lots of holdovers from Windows 3.1.

For purposes of comparison, we present the three current monarchs of the desktop—Windows 3.1, OS/2, and System 7—along with the hot new challenger, Chicago. Since navigation is a paramount consideration with any GUI, the screens below demonstrate the various ways you can get to a file. Compare for yourself.

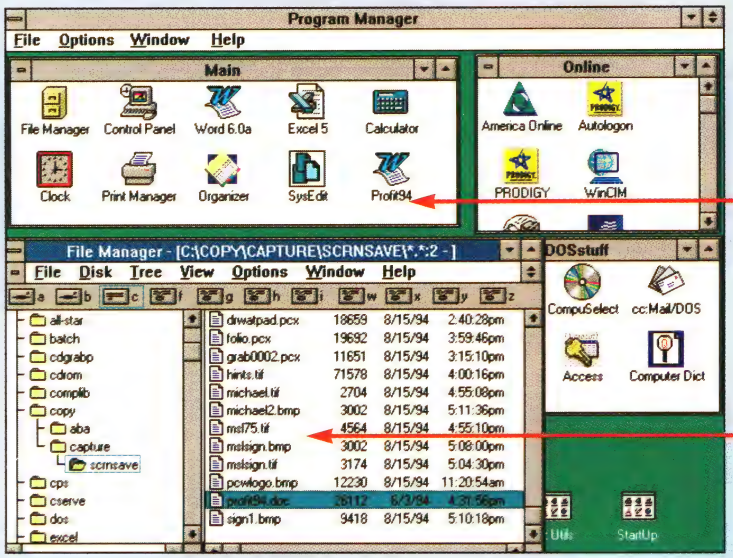
Double-click the My Computer icon to open the My Computer window, then keep double-clicking icons to open additional windows, drilling down through succeeding folders.

Right-drag a file onto the Desktop or onto the Start button to create a Shortcut—an alias that launches you directly into a file, a folder, or an application.

Explorer presents a directory tree in the left pane. Select a folder to display its contents in the right pane.



Chicago



Windows 3.1

Program Manager holds application icons, though you can drag a file icon from File Manager into a Program Manager window for faster access. File icons must appear in a window, however, not on the desktop.

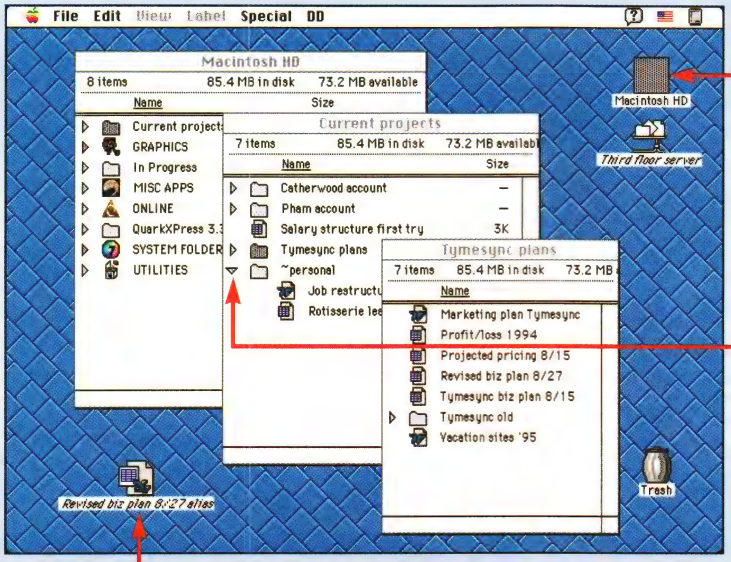
The clumsy, much-maligned File Manager is still the best way to grab a file in Windows 3.1. Buttons provide access to other drives, and the left pane displays a graphical version of a directory tree.

thousand bucks—and a lot of time."

Getting started quickly is all well and good. Continuing to work efficiently is even better. At some point in their computing lives, all Windows 3.1 users suffer the disappearing window. Usually they discover that the window in question isn't really gone, it's just hiding somewhere, probably behind other windows. Or sometimes an application is so well hidden, the user double-clicks to start another version of it.

Never again. Now there's the Taskbar, my favorite new touch in the windy interface. Whenever you open an application or document, a labeled button—with an icon—appears in a resizable strip along the bottom of the screen, just to the right of the Start button. Minimize an app and a quick animation shows the application growing smaller and disappearing into the button on the Taskbar. Click the button to reverse the animation and bring the application back on screen. As you add apps, the buttons scale themselves down to fit on the bar, eventual-

System 7



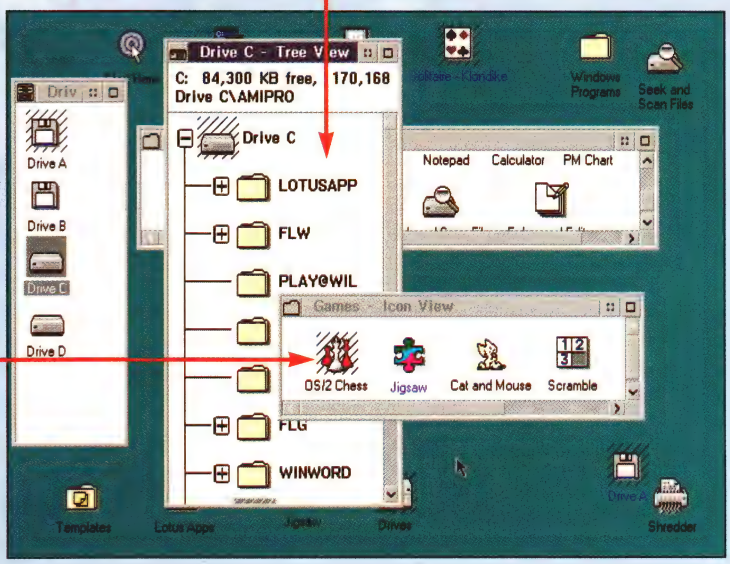
Merrily we mouse along: Double-click the hard disk icon to open the Macintosh HD window, then double-click folder icons to open successive windows till you reach your destination.

Single-click a folder's right-facing triangle and it points down, yielding a hierarchical list of files and folders contained in the parent folder.

Drag a file icon onto the desktop to create an alias—a pointer that takes you directly to the file. Microsoft admired this Macintosh feature so much, it implemented Shortcuts in Chicago.

OS/2

This as-yet-unreleased version of OS/2 is code-named Personal OS/2. To find a file, double-click a drive icon, which gives you a tree diagram showing your subdirectories as folders. Double-click a folder to see a window of file objects.



Programs, like all objects, can be stored in folders or on the desktop. Gray lines behind a program icon indicate the program is running or a folder is open. If the lettering is a different color (as with Jigsaw), it's a "shadow" of another object, like a Chicago Shortcut or a Mac alias.

ly leaving just the icon itself and a few letters of the label. (The Taskbar was a tad cryptic when I had seven apps running at once, including Microsoft Word, Excel, and PowerPoint. Reading across the Taskbar, the truncated labels for those three read 'Microsoft', 'Microsoft', and 'Microsoft'.)

You don't even have to surrender bottom-of-screen real estate. If you set the Taskbar to auto-hide, the strip disappears—think of it of as Taskbar, the Friendly Ghost. But drag the cursor to the bottom of the screen, and the Taskbar reappears, ready to catapult you into another application, file, or folder. You can drag the Taskbar to the top of the screen, reconfigure it as a vertical bar, even make it two buttons deep. This is good stuff! Here's hoping I never have to look at Windows 3.1's Task Manager again.

Other Windows 3.1 habits will be harder to break, though I may not have to. Nearly all the Windows keystrokes, shortcuts, and tricks I've learned over the years—<Alt>-<Tab>, <Ctrl>-C, double-clicking a title bar,

It's About Time...

Contents of 'Current Projects'

Business Plan for Tymesync
Profit and Loss statement

Long file names. Give your document or directory a name you—and any 32-bit application—can understand.

and the rest—still seem to work. Being unable to toggle directly to the Desktop disconcerted me, however; I had to minimize all full-screen applications first. But generally the logic of the new interface is compelling and consistent enough to keep me from complaining.

Take the right mouse button, for instance. Right-click any object—an icon or file—and you get a menu with options to open, move, explore, examine Properties, and so on, as appropriate for that object. Right-click the Desktop and check Properties and you'll jump to a dialog box from which you can change screen resolution, wallpaper, screen saver, and color scheme. But check Properties on your hard disk, and you'll see a pie chart of available disk space.

For most word processing, spreadsheet, and graphics files, a right-click will also offer a Quick View option for displaying a file's contents. Though it doesn't support printing, Quick View is a fast, handy way to examine a file. Maybe now I can ditch DOS Edit as my quick-and-dirty file viewer.

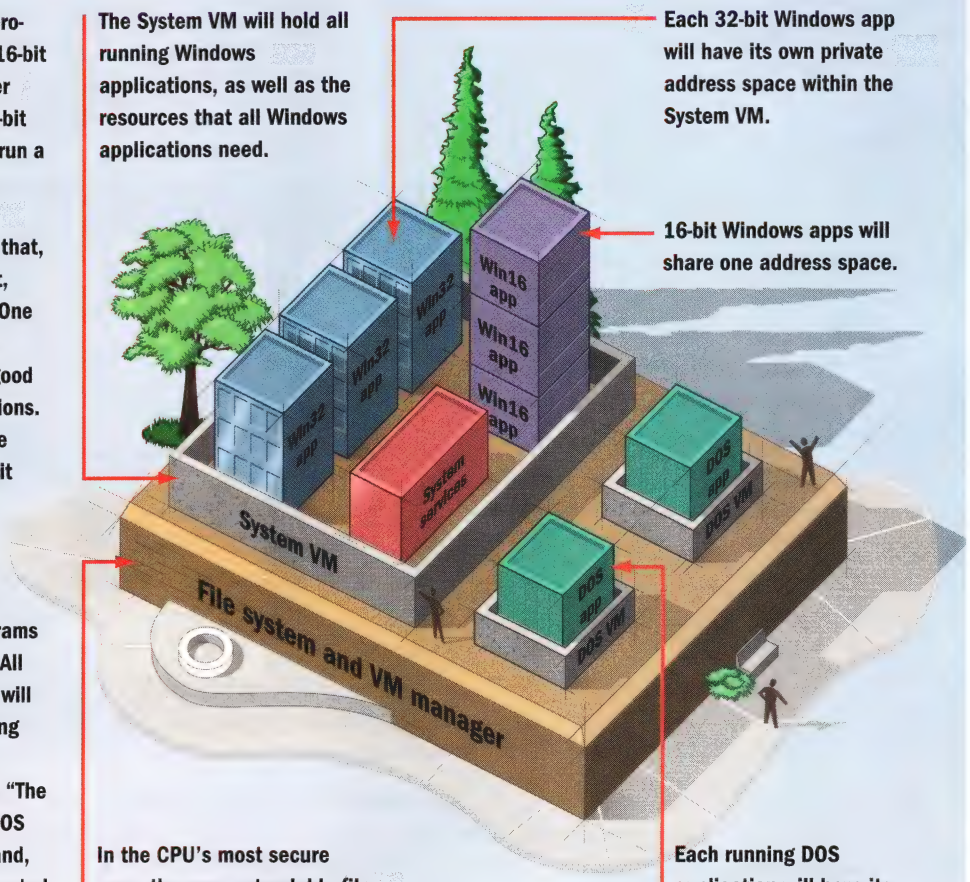
DOS Is Dead. Long Live DOS

Speaking of DOS, the version that comes with Chicago is the best so far. First, you can launch Windows programs from a windowed DOS prompt. Plus, you get handsome TrueType fonts; workable mouse support for cut, copy, and paste; and on-the-fly type scaling as you scale your DOS window. Perhaps most amazing, it breaks the eight-dot-three character count barrier for file names, listing an eight-dot-three version of a long file name on the left and the full-length file name on the right.

Built From the Ground Up

At its heart, Chicago is a compromise between 32-bit power and 16-bit compatibility. The 386 and higher chips Chicago will run on are 32-bit *protected mode* chips—they can run a process (such as a program or a group of programs) in a virtual machine (VM), a protected area that, to the programs running inside it, looks like a separate computer. One type of Chicago VM will emulate older, 16-bit chips, making it a good place to run 16-bit DOS applications.

All Windows programs, both the 16-bit Windows 3.1 and the 32-bit Chicago and NT variety, will run in another type of VM. Each 32-bit Windows application will run in its own private address space within the VM, where other programs can't hurt it—at least not easily. All 16-bit Windows 3.1 applications will share one address space, meaning that one bad 16-bit program can bring down the rest of them (see "The Application Advantage"). Each DOS program you run, on the other hand, will have its own completely protected VM, making it nearly impossible for one of them to take down any other programs if it crashes.



DAN CLARK

The Application Advantage

For Chicago to succeed, it must run your current applications better than Windows 3.1 and be supported by a host of new programs written especially for it. There are some good reasons to believe that Microsoft will pull this off.

For one, your current Windows applications may be less prone to crashes and out-of-memory errors. However, since Chicago will run all Windows 3.1 applications together in one address space (see "Built From the Ground Up"), a badly behaved program could still theoretically take down all the other 3.1 programs with it. Luckily, Microsoft has fiddled with resource management, which may make crashes less common than they are today.

Limited resources are one of the main reasons people hate Windows. The word *resources* refers to three *heaps* of memory where applications store important information. As space runs out in any one of these heaps, Windows invariably does something unpleasant. In Windows 3.1, none of these heaps can be larger than 64K (a 16-bit limitation), and they fill up quickly. Worse yet, the only program that can clean up resources is the one that left them there, and most Windows applications are about as tidy as a newborn puppy.

In Chicago, the resources will have more room to play. There will be 32-bit versions of the heaps, each able to handle up to 4GB of information. Some function calls will still be handled by the 16-bit heaps, however, so problems may persist. Chicago will free up unused resources itself, but it will not clean up after Windows 3.1 programs when any of them are running. Whether these changes will be sufficient, only time and final code will tell.

Going 32-bit

Chicago will really sing, of course, when running applications designed specifically for it. The new Windows will run 32-bit applications in their own private address spaces, making it difficult for applications to step on each other and cause problems. They will have separate message queues, meaning that when one program hangs, you can continue working in another. Win32 apps will also multitask better than Win16 apps, sharing the CPU's attention more intelligently. And Win32 apps should support long file names, OLE 2.0, and other goodies.

But will these programs exist? Almost certainly. Microsoft, of course, is working on Chicago versions of its applications, but so, according to an informal *PC World* survey, are Lotus, Borland, Symantec, Corel, Micrografx, and Novell's WordPerfect division.

Unless Chicago turns out to be hopelessly bug-ridden or doesn't ship until everyone has switched to the PowerPC, you should have no trouble running your favorite programs in the new Windows.

—Lincoln Spector

Where you get those long file names is another story, however. In Explorer, you can change an Excel file named Q1-95PRJ.XLS to "Earning Projections for First Quarter of 1995." But call that file up in 16-bit Excel and it will appear as "EARNINGP.XLS." Yes, Chicago supports long names, but until you have 32-bit versions of your apps, you'll have to live with the old DOS style. For that matter, Chicago's promised stability is likely to be undermined by old 16-bit apps, and preemptive multitasking will be unavailable to that generation of programs. If you want everything Chicago has to offer, you'll have to go 32-bit all the way.

Even in 16-bit applications, however, you can see signs of Chicago poking through. In 16-bit Microsoft apps running under Chicago, the toolbar icons pick up the new 3-D look; minimize, maximize, and exit buttons match those found in the operating system itself; and Chicago's new help icon appears in the title bar. The icon looks like a question mark; click it to change your cursor into a question mark, then click in a document or dialog box for context-sensitive help.

You can also access help from the Start menu, but unlike the confusing string of choices in Windows 3.1, Chicago's help is well-ordered and easy to navigate. If you're looking for guidance among any Control Panel tools, for instance, a right-click on any object will bring up a What's This? button you can click to get a short definition.

So am I satisfied? Of course not. I want more. Where, for instance, is the trash can, so I can throw away files? Why do some actions require single clicks and others double? Why can't one Taskbar button take me back to the Desktop? And how come I can't change folder colors, or change My Computer to Steve's Computer? This is still beta software, mind you, and some of these complaints may be addressed in the shipping version. But even with a few blemishes, Chicago looks terrific.

Beta tester Stephens concurs. "If you were to turn out the lights, shut your eyes, and think about how it should be done," he says whimsically, "Chicago would come to mind." Now we just have to wait for it to come to our PCs.

Steve Fox is a senior editor, Russell Glitman is executive editor, and Lincoln Spector is an associate editor for PC World.

Stay Tuned

But wait, there's more. In upcoming issues we'll do hands-on testing of the Chicago beta to preview how it works in the real world. We'll test the array of communications features—among them the Info Center, where you can store and manage E-mail, faxes, and files. We'll examine the mobile computing tools in Chicago, particularly the Briefcase, which provides a convenient holding tank for all your travel documents and drag-and-drop file synchronization upon your return. We'll test Chicago with the first crop of Plug and Play devices to determine if promise meets reality. And since an operating system is only as good as the applications it runs, we'll load Chicago with today's DOS and 16-bit Windows apps as well as beta versions of 32-bit Windows programs to test Microsoft's pledges of compatibility, preemptive multitasking, and performance improvements.

The course of computing is hereby changed.

From waiting.

(Runs some software fast.)

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To working.

(Runs more software much faster.)

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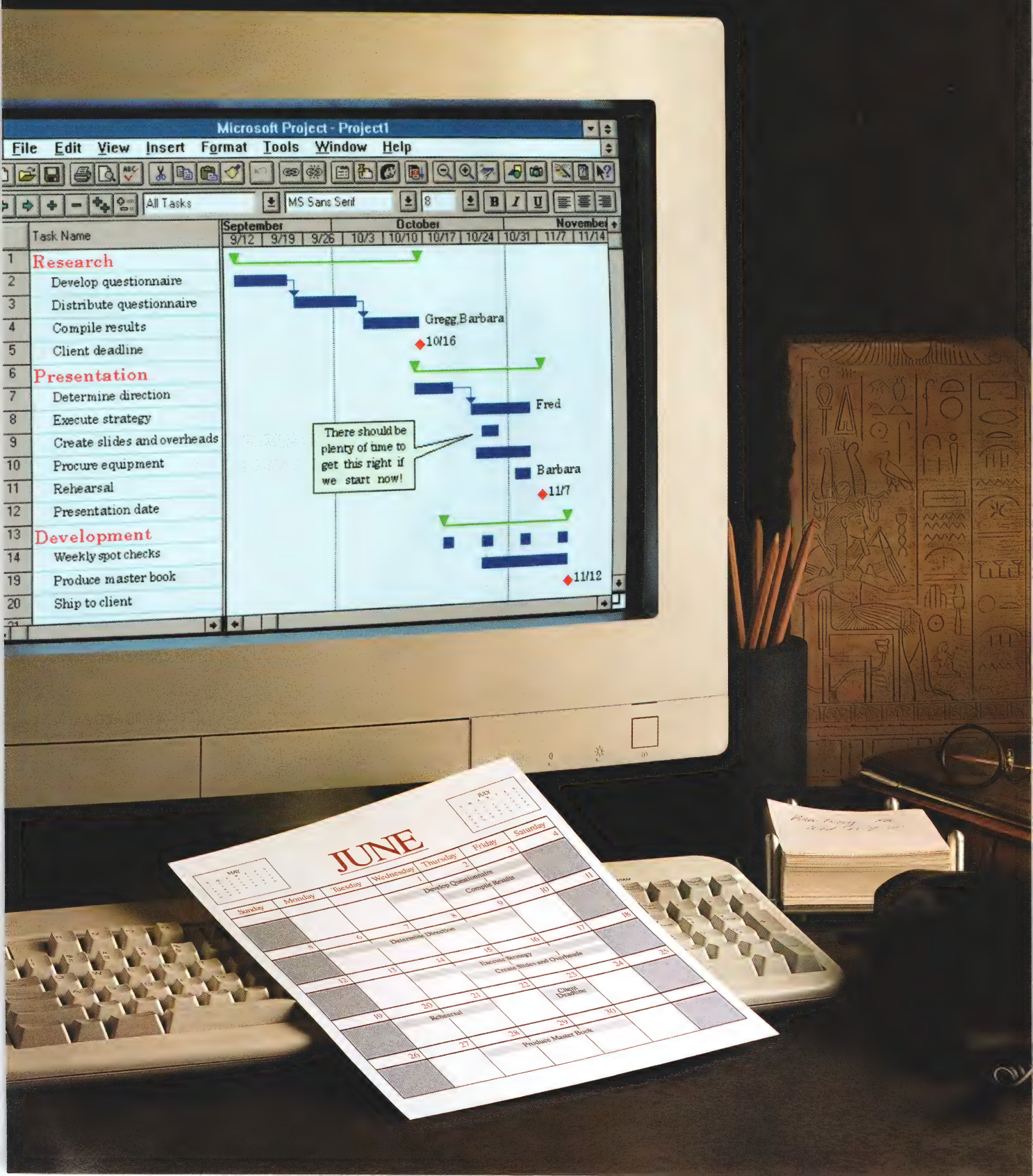

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As long as people have had things to plan, they've always looked for better ways to organize and manage the process.

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It helps you plan, manage and communicate with ease.

With new Microsoft Project, planning is easier than you ever imagined. Simply type a list of what's to be done. By whom. And how long they'll need.

Your plan is automatically converted to easy-to-read reports. Calendars. And charts. (Like the examples you can see at the left.)

It watches how you work and guides you step by step.

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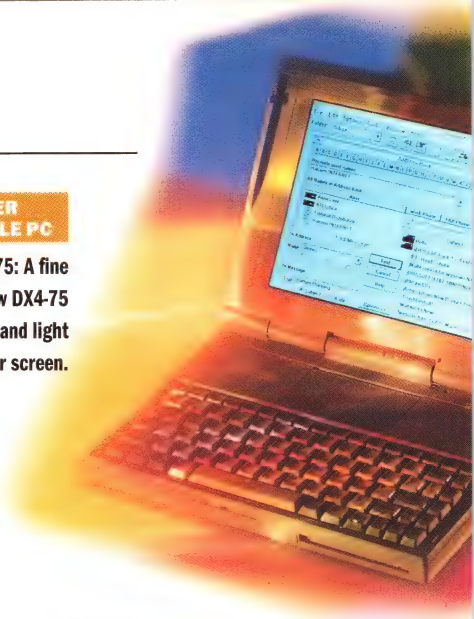
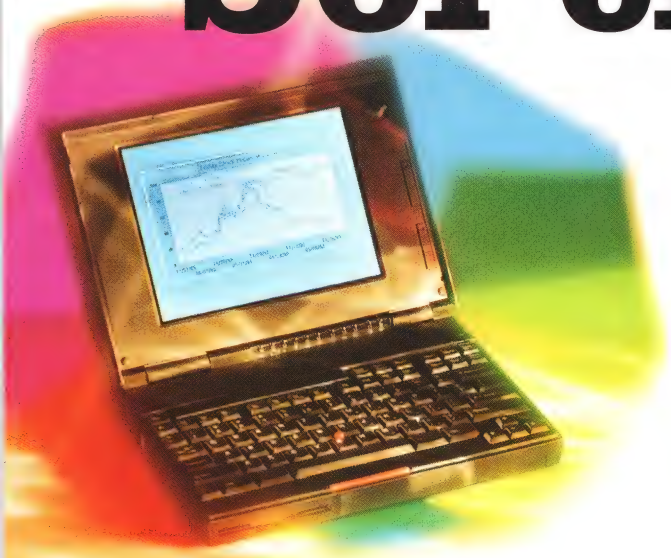
Top 20 PCs

Sorting Out



1 POWER MOBILE PC

GATEWAY COLORBOOK DX4-75: A fine standard-bearer for the fast new DX4-75 class of notebooks. It's affordable and light and has a nice dual-scan color screen.



1 BUDGET MOBILE PC

IBM THINKPAD 486SX-33: If you can live with a crisp monochrome screen, this notebook weighs just 6.6 pounds and costs just $2099.

1 BUDGET DESKTOP

COMPUADD 486DX2-66: This no-frills business box delivers fine performance and a generous hard disk for a great price.

1 POWER DESKTOP

DELL DIMENSION PENTIUM-90: In addition to a rock-solid configuration and fine support, this Pentium desktop box has the three essentials you need for top power system success—performance, performance, performance.

the PCs

From Pentium-90s to DX4s and SX2s, this month's Top 20s rank systems with 16 different CPUs. The new number ones: Dell Pentium-90, CompuAdd 486DX2-66, Gateway ColorBook DX4-75, and IBM ThinkPad 486SX-33.

This Month's Contenders pg. 143 · Power Desktops pg. 144 · Budget Desktops pg. 150 · Mobile PCs pg. 156

Dominating the mix of PCs reviewed this month are Pentium-90s—not just a couple of hot PCs outpacing the 60- and 66-MHz Pentium competition, but a compelling vanguard of systems setting a new standard in power desktop performance. Only last month we reviewed our first two Pentium-90s. Both earned power desktop systems Best Buys. This month we find another three Pentium-90s joining them on our Power Desktops Top 20, filling five of the top ten positions on the chart. That means that in just two months Pentium-90s have staked out a quarter of the available Top 20 power desktop real estate—a striking accomplishment for any new processor. The lowest any Pentium-90 ranks on our shortlist for

MICHAL VENERA

By Rex Farrance

Testing by Dean Andrews, Ulrike Diehlmann, and Susan Silvius; research and support by Gary Van Der Horn.

power desktops is number nine. And if that's not enough to get your attention, these new Pentiums manage to nail down three of the five power Best Buys this month, with just a brace of Pentium-66s left keeping them company.

The only clouds in these blue skies come from supply problems, and they should blow away before long. In the meantime, the Pentium-90—the cream of power CPUs—still isn't common among all vendors, unlike Pentium-60s and 66s. Furthermore, you may wind up waiting a while before your 90 is delivered. Currently, back-order queues stretch five weeks and more.

Sale: Budget Pentium-60s and DX4-100s

Pentium-60s and 66s are much easier to come by, and Pentiums dominate our Power Desktops chart, in part due to wholesale price cuts on the 60s and 66s. Eight systems in the Top 20 had significant price drops this month. Only five positions in the Power Desktops Top 20 belong to systems using processors other than Pentiums: three DX4-100s and two DX2-66s. Of the power desktop Best Buys, the Zeos Pantera 90 is reviewed this month. It rockets to the number two slot, boosted by its mind-boggling performance scores—the best we've seen from any system. This well-configured tower has the memory and expandability you expect in a top power system. And its $3595 price is less than early Pentium-60 models cost in much less robust configurations.

The Power Desktops chart isn't the only place we're seeing Pentiums and DX4s. Two Pentium-60s appear on our Budget Desktops Top 20 this month. These come from direct sellers Austin and MicroSource and are priced at $2499 and $2248, respectively. In coming months we'll be reviewing other budget Pentium and DX4-100 systems from Gateway 2000 and others.

On our current Budget Desktops chart, you'll find DX4-100s from National MicroComputers and Dell, priced at $2409 and $2499, respectively. We also look at the Dell OptiPlex 450s/L. This system uses Intel's new clock doubled 486SX2-50 CPU and arrives on our budget scene with a flourish, capturing the fifth-position Best Buy. Its fine showing is reinforced by the three-year warranty Dell has just extended to some of its product lines.

Newer CPUs Edge Out Old Favorites

Fourteen of the machines arrayed on the Budget Desktops Top 20 use 486DX2-66 processors, including one with AMD's DX2-66. For the time being, this CPU still looks like the favorite for budget systems. In addition, the AMD 486DX-40 continues to be represented, in the Best Buy Polywell Poly 486-40DX, reviewed in June.

Notable by its absence from the budget chart is the 486DX-33, still considered in the mass market to be the workhorse of business budget desktops. With five DX2-66s on the Top 20 under $2000, it's harder for 33-MHz systems to compete. Turnover in the Budget Desktops Top 20 continues: Five PCs break into the budget rankings this month, including the Austin Pentium-60, a member of July's Power Top 20; three are reviewed here. On the power side, six of this month's recruits make the Power Desktops Top 20.

Fast Changes on the Notebook Scene

The power notebook scene appears to be in flux: Seven of our Top 20 mobile PCs are reviewed this month, five of them in the power camp. All the new power notebooks based on the hot new DX4-75 are clustered at the top. Gateway's ColorBook DX4-75 just edges out the Ambra N75D-340 for top spot. Both Best Buys are intended for business users who want the performance and features usually reserved for expensive notebooks. These units have plenty of memory and storage, along with big 10.3-inch dual-scan color screens. The Gateway has a better service rating and a tad better performance. The Ambra is loaded with expandability and features such as built-in sound. Both systems cost under $3500.

New budget notebook contenders include the number one Best Buy IBM ThinkPad 355. For a mere $2099, this 486SX-33 provides a crisp monochrome screen and solid design in a no-frills configuration. Gateway's Handbook DX2-40 subnotebook earns a place as the number five budget mobile PC.

Buying Smart: Consumer Tips

Buy more PC than you need today. **Before your new machine's worn out, you'll likely upgrade to a more demanding application or operating system. So buy a PC that exceeds your current performance needs.**

Fight flicker with 70-Hz refresh. **Before purchasing a new monitor, make sure it supports a 70-Hz vertical refresh rate at your chosen resolution (some "bargains" don't). That rate eliminates perceptible flicker for most people.**

Check money-back guarantees. **Read the fine print on money-back guarantees. Many impose limitations not apparent from ads. You may be on the hook for shipping charges and restocking fees totaling hundreds of dollars.**

Use a credit card. **Use a credit card unless you already have a credit arrangement with the vendor. In case of dispute, the credit card company can help mediate or give a refund if you fail to receive a product.**

Rex Farrance is an associate editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).*

PC World *staff members Mike Desmond, Ulrike Diehlmann, John Goddard, Anita Hamilton, Bryan Hastings, Caroline Jones, Owen Linderholm, Melissa Riofrio, and Susan Silvius contributed to this article.*

Call 900/903-2972 and use the fax reprint numbers to order an instant fax of up to three individual systems' capsule reviews or one capsule plus features table and test reports ($4.95). To order a month's complete review ($9.95 each), enter the number for that month: December 3012; January 3001; February 3002; March 3003; April 3004; May 3005; June 3006: July 3007; August 3008. For a list of all systems tested by the PC World Test Center for Top 20s ($4.95), enter 7. Touch-tone phone required; charges appear on your telephone bill.

For more information about all products in this article, circle reader service no. 905.

This Month's Contenders

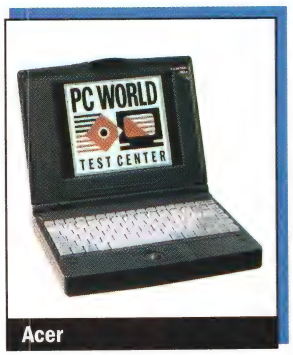
Our look at this month's contenders for the Top 20 power and budget desktops and the Top 20 mobile PCs. Icons show where systems placed on the Top 20 charts.

Acer AcerNote 780cx

PC WORLD TOP 20 3 POWER MOBILE PC

PROS: Upgradable CPU, great 1-2-3 performance
CONS: Plastic port covers break easily

Pentium may reign supreme among power desktops, but with traveling PCs, it's another story. This month three more DX4-75 machines crack our Power Mobile PCs chart, and the AcerNote 780cx is one of them. It boasts active-matrix color, the clock tripled DX4-75, and a capacious 340MB hard disk in its none-too-light 8.2-pound package. Even with its vendor-estimated street price of $3999, the AcerNote lands squarely at number three on our Power Mobile chart.



Acer

Terrific mobile performance was what we expected—and got—from this notebook with its clock tripled CPU and 8MB of RAM. While not the very quickest DX4-75 to run our test suite, it impressed us with a 1-2-3 score as fast as any we've seen from any notebook.

Most notebooks have obsolescence built-in, but the AcerNote supports a CPU upgrade—one of the few notebooks we've seen that does. Just flip the latches to release the keyboard and expose a removable CPU module. System RAM goes up to a respectable 16MB, and the 3½-hour battery life is solid for a power notebook. The adequate power management setup includes a nifty suspend-to-disk utility that swaps memory images to the hard drive, shuts down the notebook, and lets you resume where you left off.

The AcerNote 780cx comes with a one-year warranty and a 30-day money-back guarantee. Although its higher price edged the AcerNote out of a power mobile Best Buy, you do get an active-matrix color screen for the extra dough. And if you need fast portable computing from a system that will last over the long haul, the AcerNote 780cx offers upgradability you won't find anywhere else on our Mobile Top 20. *Acer America, 800/848-2237* **Reader service no. 732**

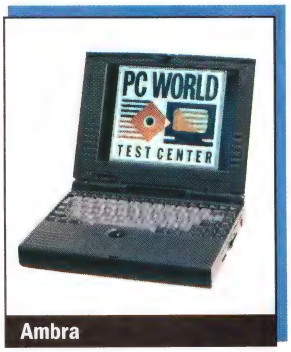
Ambra N75D-340

PC WORLD TOP 20 2 POWER MOBILE PC

PROS: Big color screen, good performance and price
CONS: Slightly heavy

Ambra is hitting the market with a new line of mobile systems, with each of its notebooks intended for a specific type of buyer. The N75D-340 targets users who want higher-end performance and features in an almost budget-priced package. And Ambra scores a bull's-eye, earning a number two power notebook Best Buy in the bargain. This class of system should hold great appeal for mainstream business notebook buyers.

The first thing that strikes you about this unit is its big 10.3-inch color screen. The dual-scan passive display is bright and clear and will satisfy all but the most demanding business users. Configured with 8MB of RAM and a generous 340MB hard disk, the N75D-340 provides the strong performance you expect from a 75-MHz DX4 notebook. And the price is a reasonable $3448.



Ambra

The N75D's 4¾ hours of battery life should satisfy even coast-to-coast commuters. At 8 pounds traveling weight, the system is a bit heavy—even for a full-size notebook—but the case was clearly designed with the traveler in mind. For example, both the cover and the wide wrist rest—the two surfaces you'll probably be handling most—have a no-slip texture. There's one PCMCIA Type III slot, and RAM upgrades to 20MB. Ambra even builds in sound capabilities. The keyboard is solid and quiet with full-travel action, and the trackball is conveniently positioned front and center.

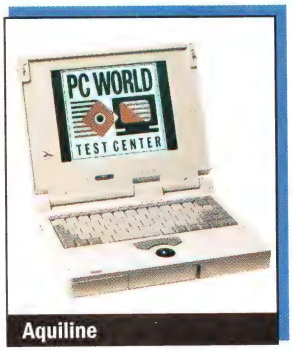
You get a one-year warranty, a 30-day money-back guarantee, and 24-hour tech support from IBM. But it's the value of this mobile PC itself—the fine performance and screen, big hard disk, and good price—that makes it a power notebook Best Buy. *Ambra Computer, 800/252-6272, 800/363-0066* **Reader service no. 733**

Aquiline Hurricane

PC WORLD TOP 20 6 POWER MOBILE PC

PROS: Excellent performance, good battery life
CONS: High price

Geared for the traveling power user who makes multimedia presentations, the Aquiline Hurricane combines an impressive 540MB hard drive, quality 16-bit sound, and a gorgeous 9.5-inch active-matrix color screen in one hefty 9.2-pound package. Configured with 8MB of RAM, this 486DX2-66 notebook turns in excellent performance. And the 4-hour battery life is very good for a high-performance notebook. But it's the multimedia extras such as external speakers, voice recognition, and cool audio files that make this system distinctive. This stylish beige notebook is a predictably pricey $5940.



Aquiline

The Hurricane notebook is generally well built. Its trackball is located so you can manipulate it with either thumb. The 84-key keyboard is not silent; while keyboard sound is a matter of taste, the keys are also wobbly and flatter than we like. A separate door covers the internal 3½-inch floppy drive, located at the front of the system right beneath the keyboard. The PCMCIA slot—which accepts two Type II cards or one Type III card—is protected by a hinged cover. The memory expansion door is secured by a screw and opens easily so you can upgrade memory to the maximum 20MB.

An optional $295 docking station offers an externally accessible drive bay along with mouse and keyboard ports and four expansion slots. Aquiline's service-and-support policies are adequate. You get a

THE TOP 20

PC WORLD

POWER DESKTOPS

1 Dell Dimension XPS P90
Great performance, features, value.

New this month · Up from last month · No change from last month · Down from last month

BEST BUYS

		Last month	Months on list	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Bus slots
1	Dell Dimension XPS P90	1	2	97	93	76/83	$3999	Pentium-90	16	1080	ISA, PCI
2	Zeos Pantera 90	–	1	96	102	72/82	$3595	Pentium-90	16	528	ISA, PCI
3	Zeos Pantera 66	2	3	92	89	72/82	$3395	Pentium-66	16	528	ISA, PCI
4	Gateway P5-90	4	2	91	92	73/77	$3830	Pentium-90	16	540	ISA, PCI
5	Gateway P5-66	3	3	90	83	73/77	$3430	Pentium-66	16	540	ISA, PCI
6	IBM PC Company ValuePoint P/60D	6	7	90	80	83/78	$3899	Pentium-60	16	424	ISA, PCI
7	Micron P90PCI PowerStation	–	1	89	98	65/86	$4599	Pentium-90	32	540	ISA, PCI
8	Micron 4100PCI Magnum	–	1	89	80	65/86	$2599	DX4-100	8	420	ISA, VLB
9	Polywell 586-90VIP	–	1	89	99	69/71	$4200	Pentium-90	16	540	PCI, VLB[2]
10	Gateway P5-60 Best Buy	12	3	88	70	73/77	$2545	Pentium-60	8	540	ISA, PCI
11	IBM ValuePoint Performance Series	–	1	87	69	83/78	$4168	DX4-100	16	540	ISA, VLB
12	Zeos 486DX2-66	7	3	87	67	72/82	$2537	486DX2-66	8	528	ISA, VLB
13	Micron P60 PCI Powerstation CD	8	4	86	75	65/86	$4138	Pentium-60	16	540	ISA, PCI
14	ALR Evolution V	9	7	86	81	78/75	$4003	Pentium-60	16	540	ISA, VLB
15	Gateway P4D-66 Best Buy	10	3	86	60	73/77	$2295	486DX2-66	8	540	ISA, PCI
16	AST Premmia LX P/60	11	2	86	78	79/79	$4138	Pentium-60	16	540	ISA, PCI
17	Axik Ace Cache 586-66PCI/MPC	13	3	85	85	69/70	$3999	Pentium-66	16	525	ISA, PCI
18	Austin Power System 60	16	6	85	64	70/80	$2499	Pentium-60	8	420	ISA, PCI
19	ALR Evolution V ST/66	17	3	84	80	78/75	$4347	Pentium-66	16	540	ISA, VLB
20	NMC Pro-System 4100	–	1	84	70	69/70	$2409	DX4-100	8	420	ISA, VLB

[1] Call 900/903-2972 and use the fax reprint numbers to order fax copies of system reviews. You may order an instant fax of up to 3 individual systems' capsule reviews or 1 capsule plus features table and test reports ($4.95); a complete month's review ($9.95 each; January 3001, March 3003, May 3005, June 3006, July 3007, August 3008); and a list of all systems

2 Zeos Pantera 90
They don't come any faster.

3 Zeos Pantera 66
A Pentium-66 class leader.

4 Gateway P5-90
Has extra-large display.

5 Gateway P5-66
This Pentium-66 is loaded.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number [1]	Comments
15"/.28	800/289-3355	July 94	3112	Pentium-90 with top-notch mix of speed, features, and price is a great power user system.
15"/.28	800/554-5220	current	3123	Zeos Pentium-90 is the fastest system we've tested, a real number cruncher.
15"/.28	800/554-5220	June 94	3091	Fastest Pentium-66 is a fortuitous blend of power and price.
17"/.26	800/846-2000	July 94	3114	Powerful graphics workstation with big 17-inch monitor.
17"/.26	800/846-2000	June 94	3093	Similar design to no. 4, graphics workstation for penny-pinchers.
15"/.28	800/772-2227	Jan 94	3041	Price cuts keep long-lasting IBM Pentium in strong contention.
15"/.28	800/438-3343	current	3124	Third-fastest system, loaded with RAM, would make a great server.
14"/.28	800/438-3343	current	3125	Micron DX4-100 replaces previous Micron PCI-based offering with a lower price.
15"/.28	800/999-1278	current	3126	Pentium-90 is second-fastest we've tested and full of features—including PCI and VLB slots on the same system.
14"/.28	800/846-2000	May 94	3127	Good all-around tower Pentium-60 has low, low price.
17"/.28	800/772-2227	current	3128	High-quality DX4-100 has a surprisingly high price.
14"/.28	800/554-5220	June 94	3095	Best DX2-66 on the power list keeps up with some Pentiums.
17"/.26	800/438-3343	May 94	3094	Solid basic Pentium workstation with nice monitor.
14"/.28	800/444-4257	Jan 94	3044	One of the first Pentiums. Newer systems outranking it now.
15"/.28	800/846-2000	June 94	3066	Cheapest power system. Good performance and storage place it no. 2 on Budget Top 20.
15"/.28	800/876-4278	July 94	3115	A solid Pentium-60 but a bit pricey in the current market.
15"/.28	800/234-2945[3]	June 94	3098	Well-designed desktop unit but priced higher than some Pentium-90s.
15"/.28	800/752-1577	Mar 94	3062	Aggressive pricing places this Pentium high on the Budget chart.
15"/.28	800/444-4257	June 94	3101	High-priced but high-quality Pentium-66.
15"/.28	800/424-2983	current	3129	DX4-100 that keeps up with the Pentiums makes a good basic workstation. Also no. 9 on the Budget chart.

tested by the PC World Test Center for the Top 20s ($4.95). Touch-tone telephone required. Charges will appear on your telephone bill.

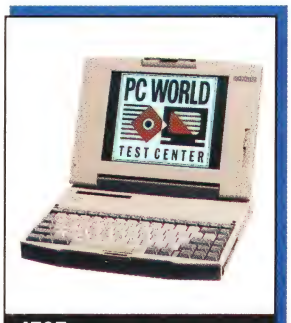
[2] With ISA bus.
[3] In California call 408/735-1234.

one-year warranty, a 30-day money-back guarantee, and a quick one-day turnaround on factory repairs. You can buy an on-site service policy for $260—not bad, considering it covers you for three years. Tech support is available 9 hours a day on weekdays but isn't toll free. The Aquiline Hurricane is worth a look—but only for users who need and can afford a notebook primed for producing sophisticated presentations. *Aquiline, 518/272-0421* **Reader service no. 734**

AT&T Safari 3181 450/s

PROS: Fine color display
CONS: Steep price

With an estimated street price of $4967, the Safari 3181 won't be everyone's cup of tea. A DX2-50 processor isn't bad in a notebook, and 12MB of RAM is excellent. But this unit is slower and more costly than three of the DX4-75s on our Power Mobile PCs chart. So why take a look? According to a recent survey of our readers, screen quality is an overriding concern when shopping for a mobile PC. AT&T doesn't cut corners: The Safari's NEC-manufactured active-matrix LCD is one of the best we've seen.



AT&T

Performance on the Safari 3181 is typical of its notebook processor class. An LED panel above the keyboard reports system status—handy when you're wondering, for example, how much juice remains in your battery. We recorded battery life of 3½ hours, acceptable by power notebook standards, and you can replace the internal floppy drive with a second battery pack to run longer away from an outlet. Online documentation holds comprehensive help in case you run into trouble. AT&T Mail and fax-modem software are preinstalled on the hard disk, but the fax-modem itself costs extra.

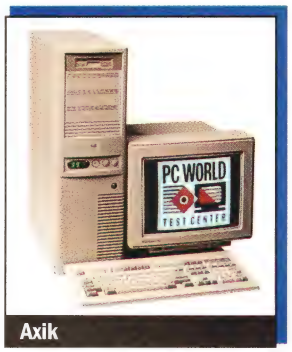
The Safari comes with a superb three-year warranty and free on-site service for the first year. Toll-free technical support is available 24 hours a day, seven days a week. Considering the great screen and the fine service and support, the Safari 3181 is quite tempting—even with DX4-75s leading the pack of power mobile PCs. *AT&T, 800/225-5627* **Reader service no. 735**

Axik AcePower 586-90V

PROS: Caching hard disk controller, good expandability
CONS: Slow for a Pentium-90

Axik's $3898 AcePower 586-90V is a respectable entry in our power sweepstakes. In fact, it misses our Power Desktops Top 20 by a whisker. Despite its 90-MHz Pentium processor, though, speed isn't its forte. Don't get us wrong—this is a quick PC. But it performs more like a fast Pentium-66 than a typical Pentium-90. You can attribute a bit of its lackluster showing to its memory setup: It has just 8MB of RAM rather than the 16MB we recommend for a power system. Axik does supply a generous 512K secondary cache and a 4MB Promise VL bus caching hard disk controller. Ironically, though, on the disk-intensive Paradox for DOS test, the AcePower 586-90V's score was not outstanding.

The 540MB hard drive is good basic fare on a Pentium power system. But the 2MB Diamond Stealth 32 VLB graphics accelerator is a cut above average, and Axik also provides a nice 15-inch ADI MicroScan monitor. With the local bus hard drive and graphics controllers installed, you still get one VL bus slot free, along with four free 16-bit slots. And this big tower model gives you six free drive bays (three externally accessible). The system profits from the spacious case and clean layout.



Axik

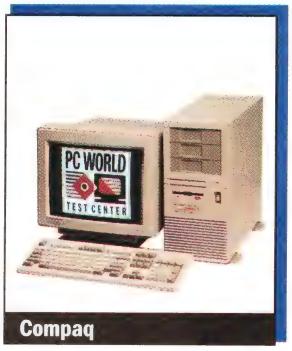
Axik's service policies are solid if unremarkable and include a one-year warranty, a year of free on-site service, and reasonably responsive 12-hour toll-free tech support on weekdays (6 hours on Saturdays). In addition, Axik has a two-day turnaround policy on factory repairs. This power system is a decent value. We just wish its performance were more in tune with the 90s. *Axik Computer, 800/234-2945, 408/735-1234* **Reader service no. 736**

Compaq Prolinea MT 4/33s Model 270/W

PROS: Excellent expandability, three-year warranty
CONS: 33-MHz performance

The Prolinea MT 4/33s has some of the earmarks of a terrific budget PC. Its $2090 street price is reasonable for a system with 8MB of RAM, a 270MB hard drive, and fantastic service and support. Furthermore, the Prolinea performs over 20 percent faster than the typical 486SX-33 we've seen. Unfortunately, even a fast 33-MHz 486 is slow compared to the similarly configured 486DX2-66 you could buy elsewhere for about the same money. Still, aside from the comfort of a Compaq nameplate, this Prolinea has many commendable features, including plenty of room to add components.

Pop the lid on this minitower's easy-open case, and you'll see a roomy, well-laid-out motherboard with five free 16-bit slots and three free SIMM sockets. You can approach the system's 64MB memory maximum without tossing out the 4MB SIMM that is already installed, since each free socket accepts 16MB or 32MB SIMMs in addition to the more common 4MB and 8MB modules. Another 4MB of RAM is soldered onto the motherboard.



Compaq

A proprietary slot next to the 238-pin ZIF CPU socket accepts a 128K secondary cache module. And you'll find a healthy three free externally accessible drive bays. You also get a 15-inch monitor and Compaq's integrated 1MB local bus graphics accelerator. Compaq even provides TabWorks, a Windows desktop manager that lets you assign icons to any file and arrange files and applications in an easy-to-use notebook metaphor. The Prolinea MT comes with an excellent three-year warranty, free on-site service for the first year,

WinBook XP

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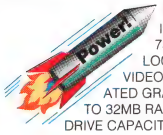
Speed and Power



SUPERFAST INTEL DX4-75MHz WITH LOCAL BUS VIDEO ACCELERATED GRAPHICS, UP TO 32MB RAM AND HARD DRIVE CAPACITY TO 520MB

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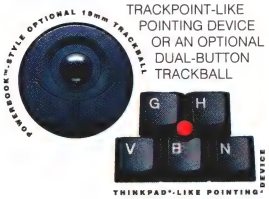

Great Ergonomic Features

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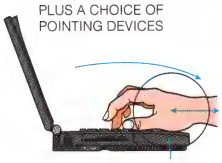

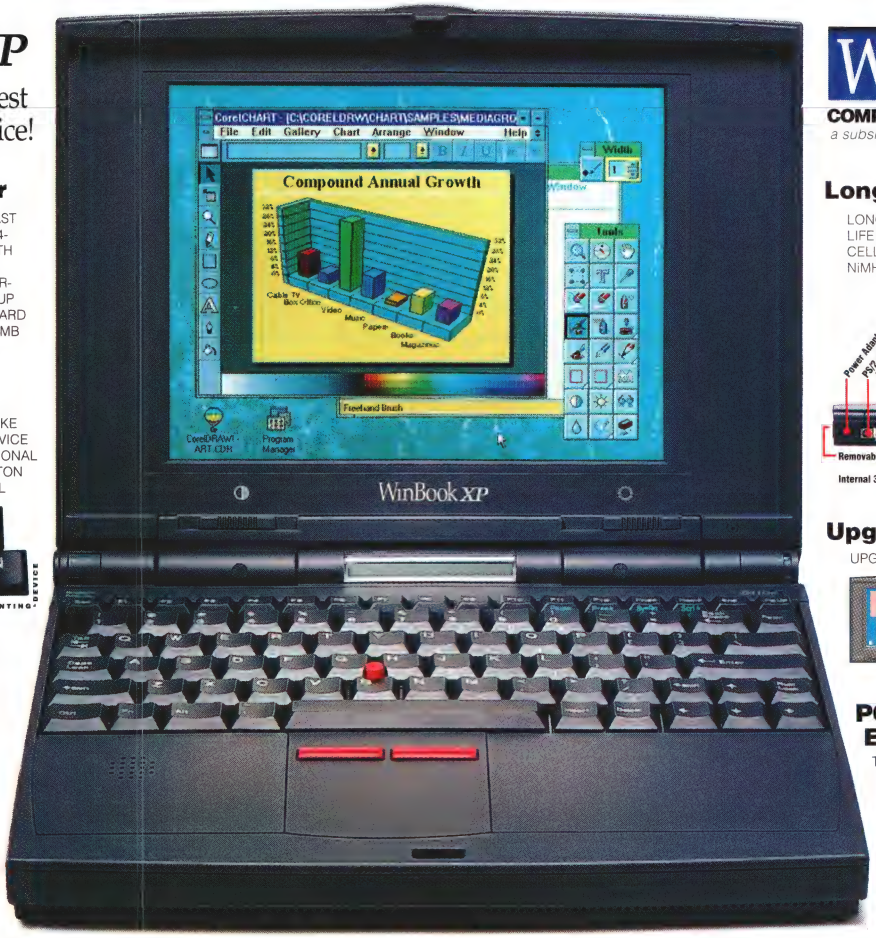

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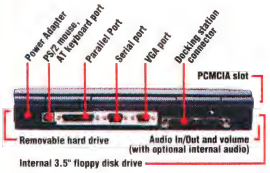

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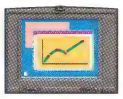
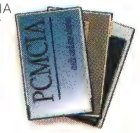
UPGRADABLE SCREEN AND USER-EXPANDABLE RAM, REMOVABLE HARD DRIVE AND PCMCIA CAPABILITIES



PCMCIA Expansion

TWO TYPE II OR ONE TYPE III INDUSTRY-STANDARD PCMCIA SLOT



The 75MHz WinBook XP

The only feature we forgot was the high price tag.

Full of features and plans for a big future—the 75MHz WinBook® XP brings you up to a new height in performance and value. The 32-bit local bus video Rocketchip accelerator boosts your graphics performance level and a ten-cell NiMH 2500mA battery pack lets you run power-hungry programs longer. Plus an LCD indicator lets you monitor functions at a glance. You get the same unique ergonomic features that critics raved about with the original WinBook—full size keys, a sloping wrist rest, and now your choice between the TrackPoint™ like pointing device or an optional 19mm dual-button trackball.

To give the WinBook XP a big future, you can upgrade components as you need to with user-upgradable RAM to 32MB, upgradable screen, removable hard drives to 520MB capacity and PCMCIA capabilities. Options include a 14.4 fax/voice/data modem, internal audio and docking station.

Along with your WinBook XP, you get excellent support, a 30-day money-back guarantee, quick service turn-around, a one-year limited warranty on parts and labor plus toll-free technical support for the life of your computer. Your purchase is backed by 15 years of computer experience and over 2.2 million satisfied customers. Call us toll-free to order your WinBook XP today.

WINBOOK XP FEATURES

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- REMOVABLE 120 TO 520MB HARD DRIVE
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Circle 197 on reader service card

and 24-hour toll-free tech support. This unit has a lot going for it. But lower-priced, faster competition bumps the Prolinea MT off our Budget Desktops Top 20. *Compaq Computer, 800/345-1518, 713/378-8820* **Reader service no. 737**

Dell Latitude 433C-170

PROS: Solid construction, excellent battery life, nice display
CONS: Small hard drive

Anyone who computes on the go knows the value of long battery life. Our tests indicate that the Dell Latitude 433C-170 486SX-33 notebook will keep you working on the train or plane for more than 5 hours at a pop—a showing likely to earn it plenty of points with the commuter computer crowd. Our $2999 7.4-pound unit came with a respectable 8MB of RAM upgradable to 20MB and a 170MB hard drive. Performance with this 33 isn't outstanding, although it's still respectable in its CPU class.

The sleek black case is handsome, and the solid construction—including an extra-strong cover on the PCMCIA Type III slot and a tough port-panel hinge—gives this notebook a rugged feel. You get a surprisingly vivid 9.5-inch passive color screen with easy keyboard-driven controls. The quiet keyboard has comfortable key travel, and the slightly concave keys are big and well spaced. The <Fn> function key is right next to the <Space> bar, so you won't confuse it with other control keys. And the minitrackball, built into the lower right corner of the keyboard, is reasonably usable.

Dell Latitude

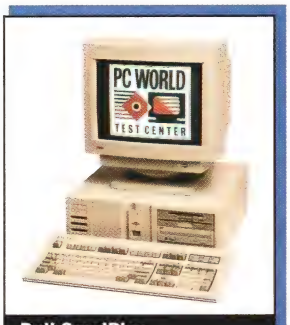
Dell includes a 2400/9600-bps PCMCIA fax-modem and a nice bundle of software. There's a one-year warranty, 24-hour toll-free technical support, and a two-day turnaround policy on factory repairs—with Dell paying shipping costs both ways. Although this new Dell notebook is a good system with fine battery life, it's a tad too costly for our Budget Mobile PCs chart and lacks the mix of performance and features it takes to crack our Power Mobile PCs list. *Dell Computer, 800/613-3355* **Reader service no. 738**

Dell OmniPlex 590

PROS: Quality components, copious RAM, 1GB hard drive
CONS: Steep price, uneven performance

The Dell OmniPlex 590 desktop PC aims to win the hearts of ultimate power users with a hefty configuration designed to quicken the pulse: You get a Pentium-90 CPU, a mammoth 32MB of RAM expandable to 192MB, and a jumbo 1GB SCSI hard drive. Unfortunately our tests on one of the first of these systems revealed inconsistent performance. While most test benchmarks were competitive with those of typical-to-quick Pentium-90s, the Paradox for DOS test took almost three times as long as we expected—even after repeated runs. So although the Dell OmniPlex 590 is definitely a high-performance machine, its overall performance fell into a virtual tie with that of a typical 66-MHz Pentium. This isn't the kind of score you expect from a $7469 Pentium-90.

In line with the deluxe configuration, Dell provides a triple-speed NEC SCSI CD ROM drive and an integrated ATI Mach32 PCI graphics accelerator. A 15-inch Dell monitor is included, though the system failed to fill the available display area adequately on the monitor provided. You get three free EISA slots and two free EISA or PCI slots. With the CD ROM drive installed, there is just one free externally accessible 5¼-inch drive bay.



Dell OmniPlex

Dell's service policies are returning to the leading edge, with a new three-year limited warranty complementing the year of free on-site service and the 24-hour tech support. On balance—even with the high price—if the OmniPlex 590's performance were consistent and as high as its best scores, it would have made our Power Desktops Top 20. *Dell Computer, 800/289-3355* **Reader service no. 739**

Dell OptiPlex 450s/L

PC WORLD TOP 20 5 BUDGET DESKTOP

PROS: Fast 50-MHz performance, three-year warranty, CD ROM drive, sound card
CONS: No free drive bays, only two free slots

This 486SX2-50 budget compact features the newest CPU on the market. The 50-MHz doubler is the first clock multiplier from Intel without a built-in math coprocessor. The coprocessor's absence doesn't seem to hurt performance: Our test results on the Best Buy Dell OptiPlex 450s/L were good, even with number-crunching apps such as Excel. Overall, it's not far behind the typical DX2-66. Of course you wouldn't choose this processor for applications such as CAD that rely heavily on a coprocessor. But for typical Windows business apps, you can't do much better without spending more money than the mere $1957 Dell charges for this PC.

The low price doesn't mean a skinny features set. Our OptiPlex 450s/L came configured with 4MB of RAM upgradable to 64MB, a 128K secondary cache, a 270MB hard drive, and a 14-inch monitor. While none of these is generous, they're all reasonable budget fare. But Dell also throws in a Panasonic CD ROM drive and a SoundBlaster sound card.

Dell OptiPlex

The unit we evaluated had a standard 16-bit ISA expansion bus, but for another $50 you can get this model with a couple of VL bus slots. The only big drawbacks we see on this budget wonder are the lack of free drive bays and the scant two free 16-bit slots. The 2MB local bus graphics accelerator is integrated. Dell's service reputation has remained justifiably high over the years. And now the support package includes a three-year limited warranty (on-site service for the first year only) and 24-hour phone support. This Best Buy 50 may not be for the expansion conscious, but it's an awfully attractive little budget desktop. *Dell Computer, 800/289-3355* **Reader service no. 740**

I don't understand

my new healthcare plan,

Latin,

my parents,

how tofu can be so popular,

why athletes make

more money than doctors,

why everybody makes

more money than me,

and why anyone would buy

an NEC SuperScript™ 610 printer.

Why? Because it's the fastest and easiest personal laser printer you will ever use.

Besides you're smart enough to recognize a good idea when you see one. You're not afraid of new technology. And you're definitely tired of waiting every time you print from Windows.

But still you have your doubts. What exactly is this new technology? And what's in it for you?

Well, it's called GDI printing and it works like this. GDI (Graphical Device Interface) is the native language of Microsoft Windows.™ Because the SuperScript 610 thinks and speaks the same language it doesn't have to translate or reformat your documents before it can print. Which means it's 30% to 300% faster than ordinary printers. And what you see on the screen is truly what you get.

Okay, this is obviously a great Windows printer. But can it print PCL and DOS? Of course. As long as you open the application from within Windows. There's even a $99 PostScript™ option if you need it.

With all this sophisticated technology, you'd expect the 610 printer to be complicated and hard to use. But it's actually much easier to use than ordinary printers. And it only takes minutes to install.

To achieve this kind of ease we did have to eliminate a few things, however. Like the controller. Why have one when the PC can do the file processing? It's faster and more efficient. It also allows you to print fonts and graphics without any limitations. And every time you upgrade your PC, you automatically upgrade your printer.

We also moved the operator panel to the PC screen — where it belongs. That way graphical displays and animated icons can show you exactly what's going on at all times.

By the way, the SuperScript 610 is extremely compact, 300 dpi, prints 6 pages per minute and it comes with a 2-year overnight replacement warranty.

And it costs under $500. What's so hard to understand about that? For more information, call1-800-NEC-INFO or for details via fax, call NEC FastFacts™ at 1-800-366-0476, and request document #SW610.

NOVEMBER 1993 BYTE BEST VALUE GENERAL BUSINESS PRINTER

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NEC

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THE TOP 20

PC WORLD

BUDGET DESKTOPS

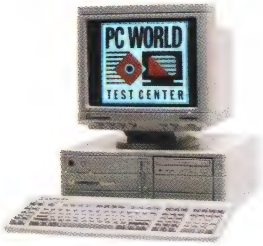
1 CompuAdd C466D
Price drop takes DX2-66 to top.

➤ New this month
▲ Up from last month
◄ No change from last month
▼ Down from last month

BEST BUYS

		Last month	Months on list	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Bus slots
1	▲ CompuAdd C466D	3	4	88	56	78/75	$2195	486DX2-66	8	425	ISA, VLB
2	▼ Gateway P4D-66 Best Buy	1	3	88	60	73/77	$2295	486DX2-66	8	540	ISA, PCI
3	▼ Polywell Poly 486-40DX	2	3	87	51	69/71	$1650	AMD 486DX-40	8	270	ISA, VLB
4	◄ ATronics PCI Emerald	4	2	86	59	69/69	$1995	486DX2-66	8	256	ISA, PCI
5	➤ Dell OptiPlex 450s/L	–	1	86	52	76/85	$1957	486SX2-50	4	270	ISA
6	➤ Austin Power System 60	–	1	85	64	70/80	$2499	Pentium-60	8	420	ISA, PCI
7	▼ Everex Step VL EISA DX2/66	6	4	84	58	83/68	$2298	486DX2-66	8	240	EISA, VLB
8	▲ Austin Premier 486 System	13	3	84	50	70/80	$1999	486DX2-66	8	340	ISA, VLB
9	➤ NMC Pro-System 4100	–	1	84	70	69/70	$2409	DX4-100	8	420	ISA, VLB
10	▲ MicroSource Tempest Premier/PCI	14	2	83	65	69/70	$2248	Pentium-60	8	340	ISA, PCI
11	◄ Axik 486DX2-66PCI	11	6	83	57	69/70	$2198	486DX2-66	8	340	ISA, PCI
12	▼ Midwest Micro 486DX2-66	7	2	83	51	69/68	$1899	AMD 486DX2-66	8	340	ISA, VLB
13	▼ Dell OptiPlex 4100/L	8	3	83	71	76/85	$2499	DX4-100	8	170	ISA
14	▼ Acma 486DX2-66 PCMCIA System	10	4	82	54	72/81	$2142	486DX2-66	8	340	ISA, VLB
15	➤ DTK Feat-38	–	1	82	44	78/79	$1909	486DX2-66	4	210	ISA, VLB
16	▼ Quantex Q486DX2/66MM-4	15	3	82	55	69/69	$2298	486DX2-66	8	540	ISA, VLB
17	▼ AST Bravo MT 466d	9	7	82	53	79/79	$2150	486DX2-66	8	170	ISA
18	▲ MIS M466T	22	7	82	59	69/68	$1999	486DX2-66	8	240	ISA, VLB
19	▼ IBM PS/1 Consultant DX2-66	18	7	81	42	83/78	$2329	486DX2-66	8	420	ISA
20	➤ MicroExpress MicroFlex PCI/66	–	1	81	60	69/74	$2499	486DX2-66	8	256	ISA, PCI

[1] Call 900/903-2972 and use the fax reprint numbers to order fax copies of system reviews. You may order an instant fax of up to 3 individual systems' capsule reviews or 1 capsule plus features table and test reports ($4.95); a complete month's review ($9.95 each; December 3012, February 3002, March 3003, April 3004, May 3005, June 3006, July 3007, August



2 **Gateway P4D-66 Best Buy**
DX2-66, 540MB drive, $2295.

3 **Polywell Poly 486-40DX**
AMD DX2-40 for $1650.

4 **ATronics PCI Emerald**
A PCI DX2-66 for $1995.

5 **Dell OptiPlex 450s/L**
Brisk SX2-50 performance.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number [1]	Comments
15"/.28	800/627-1961	May 94	3103	Price cut nudges this well-rounded DX2-66 into the top spot.
15"/.28	800/846-2000	June 94	3098	Fastest budget Best Buy just edged out for no. 1.
14"/.28	800/999-1278	June 94	3104	Lowest-cost Best Buy gets surprisingly good performance from AMD DX-40.
14"/.28	800/488-7778	July 94	3120	Low-cost PCI-based 486DX2-66 with good speed.
14"/.28	800/289-3355	current	3130	One of first SX2-50s is surprisingly fast with just 4MB of RAM. Minimal expandability.
15"/.28	800/752-1577	Mar 94	3062	Price drop moves previously reviewed Pentium into budget category, just shy of Best Buy.
15"/.28	800/821-0806	Dec 93	3105	Fast EISA-based system could have a larger hard drive.
14"/.28	800/752-1577	June 94	3109	Price drop boosts this DX2-66 system up the Top 20 chart.
15"/.28	800/424-2983	current	3129	DX4-100 is the second-fastest budget system. Also no. 20 power system.
14"/.28	800/848-5161	July 94	3122	Further price cut pushes Pentium up the chart.
14"/.28	800/234-2945 [2]	Mar 94	3063	Good all-around DX2-66 holds up well in tough market.
15"/.28	800/728-8582	July 94	3121	Solid AMD DX2-66 system at a good price.
14"/.28	800/289-3355	June 94	3111	Fastest budget system held back primarily by its minimal expandability.
15"/.28	800/786-6888	May 94	3106	Minitower with PCMCIA slot allows PCMCIA peripheral swaps for notebook owners.
14"/.28	800/298-2358	current	3131	Slow-footed DX2-66 has attractive price and good service.
15"/.28	818/810-0098	June 94	3107	High-value multimedia system with large hard drive.
15"/.28	800/876-4278	Feb 94	3110	Decent DX2-66 with reasonable price is hurt by hard drive under 200MB.
14"/.28	800/733-9188	Dec 93	3052	Low-cost, bare-bones DX2-66 gets a boost from its snappy performance.
14"/.28	800/772-2227	Feb 94	3025	Great IBM reliability and user-friendly features offset sluggish performance.
14"/.28	800/989-9900	Apr 94	3074	Price drop helps this swift DX2-66 edge onto the Budget Top 20.

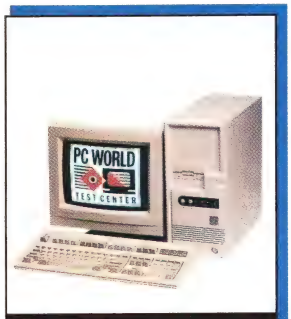
3008); and a list of all systems tested by the PC World Test Center for the Top 20s ($4.95). Touch-tone phone required. Charges will appear on your telephone bill.

[2] In California call 408/735-1234.

Diamond DT 586-90

PROS: Good price, plenty of expansion room
CONS: Poor performance for a Pentium-90

Do you dream of Pentium-90 power but think you can't afford it? Then prick up your ears at the Diamond DT 586-90's price. For $2850, you don't get the ultimate power user's configuration, but you can expand the 8MB of RAM later, and the 420MB hard drive should get you started. This tower system comes with a 2MB Genoa 32-bit PCI graphics accelerator—but just a 14-inch monitor. When testing the system's performance, we immediately ran into rough spots. On the primary check, we discovered the clock had been set to push the 90-MHz CPU to 100 MHz. Aside from violating Intel specs, pushing the processor can cause CPU overheating and unreliable processing. A Diamond representative told us the incorrect setting had been implemented by mistake, and we reset the system to run at its proper speed before beginning our test suite. The results showed the DT 586-90 to be a slow performer compared to the typical Pentium-90. Granted, this PC has just 8MB of RAM—but its overall performance approximately equals that of our number eight power desktop system, the Micron 4100PCI Magnum DX4-100 VL bus system. However, the similarly configured Micron PC is about $250 cheaper.



Diamond

Expandability on the Diamond is good, with two free 16-bit slots, one free PCI slot, and a slot you can fill with either a PCI or a 16-bit card. You'll also find four free externally accessible drive bays. Support policies are decent, with a 15-month warranty on parts, 24-month coverage for labor, and a year of free on-site service. Overall, this bargain Pentium-90 is an okay value—but not quite good enough to make our Power Desktops chart. *Diamond Technologies, 800/989-7253, 714/533-9910* **Reader service no. 741**

DTK Feat-38

PC WORLD TOP 20
15 BUDGET DESKTOP

PROS: Two-year warranty, good price
CONS: Excessive display flicker in default configuration

DTK's Feat-38 is a plain vanilla, entry-level budget system all the way. But for just $1909 on the street, you get a sturdy 486DX2-66 minitower with 4MB of RAM, a 128K secondary cache, and a 210MB hard disk. With this lightweight configuration, it's not surprising the unit ran our tests significantly more slowly than the typical 486DX2-66—even with a 2MB VL bus caching hard disk controller.

DTK

When you're starting from just 4MB, the most logical way to improve performance significantly is to add memory, and three free SIMM sockets make expansion easy. Intriguingly, the Feat-38's motherboard supports a mind-boggling 256MB of RAM—far more than you're likely to need. You get three free drive bays (two externally accessible), in addition to four free 16-bit slots and one free VL bus slot. The clean interior permits full cards in all but one 16-bit slot. In general, we like to see a better video subsystem on business PCs. The VL Cardex graphics card with 1MB of DRAM is okay—as long as you don't have to work with a lot of colors at a high resolution—but when the 14-inch Energy Star monitor was set up in the default configuration, it had too much flicker for our taste.

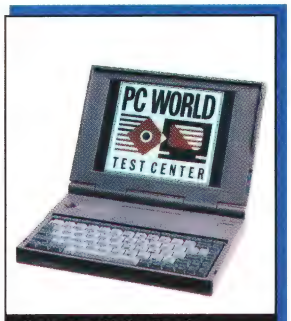
DTK's two-year warranty is a nice touch, with a year of on-site service available for a reasonable $50. To sweeten the mix, DTK has a two-day turnaround policy on factory repairs. This is a minimally configured DX2-66, but its reasonable price is sufficient to earn it number 15 on our Budget Desktops Top 20. *DTK Computer, 818/810-0098* **Reader service no. 742**

Gateway ColorBook DX4-75

PC WORLD TOP 20
1 POWER MOBILE PC

PROS: Nice dual-scan color screen
CONS: Imprecise trackball

In the company's ubiquitous display ads, the Gateway ColorBook DX4-75 looks alluring, seeming to provide everything you could want in a color power portable: 8MB of RAM, a 75-MHz CPU, and a solid 250MB hard drive. Is that image simply a flashy illusion? Not in this case. With the ColorBook, seeing is believing: Once you use this system you quickly realize it really is a terrific notebook. It's a fantastic performer and our number one power mobile Best Buy.



Gateway ColorBook

The $3495 price is competitive for a quick, relatively light 7.2-pound system with a very good 4½ hours of battery life. The system's crisp 10.3-inch dual-scan passive color display strikes an effective balance between quality and economy. Like the number two power mobile Best Buy Ambra N75D-340, this product is strategically poised to meet the high needs—and low equipment budgets—of typical business notebook buyers. And Gateway did not forget the small points: Keyboard feel is good, with full-travel keys. The hidden trackball is a neat design feature, sliding out like a drawer from under the keyboard. But if you're a user who's rough on equipment, we suspect that you could break the trackball unit. On the downside, the amount of play in the trackball itself makes precise cursor movements somewhat difficult.

You get a single PCMCIA Type III slot, and you can expand RAM to 20MB. If you need a greater amount of storage, the company will sell you this unit with a 340MB hard disk for $3799. Gateway's support policies are solid: You get a one-year warranty, a 30-day money-back guarantee, and 18 hours of toll-free tech support on weekdays, 5 hours on Saturday. Adding up all the pluses on this Best Buy notebook, we find it has the poise it takes to make a real power winner, providing high-end performance and functionality at an affordable cost. *Gateway 2000, 800/846-2000* **Reader service no. 743**

He eats your storage space

FOR LUNCH

and your money

FOR DINNER.

(filus humongous)

You're well acquainted with this megabyte-eating beast.

But perhaps you're not yet familiar with DynaMO,™ the magneto-optical solution that eliminates the horrors of data storage.

Drive Specifications	
Capacity	128-230 MB
Data transfer rate	2.1 MB/s (max.)
Average seek time	30 ms (typ.)
Rotational speed	3,600 rpm

Like Syquest, with DynaMO you save your files to removable cartridges. But unlike Syquest, you don't have to break the bank each time around. And the 128 and 230 MB industry standard 3.5-inch cartridges you use aren't nearly as vulnerable. In fact, Fujitsu cartridges come with a lifetime warranty.

Turbo MO performance By CharisMac Engineering

Our Macintosh version comes with Turbo Mo software for up to 60% faster performance.

There's nothing frightening about setting-up DynaMO either. You just plug the drive into your PC or Macintosh.

Get the data on DynaMO by calling **1-800-831-4094.** Or request information by fax at 1-408-428-0456 (document 1368).

We'll show you how to enjoy some monstrous savings.

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Circle 71 on reader service card

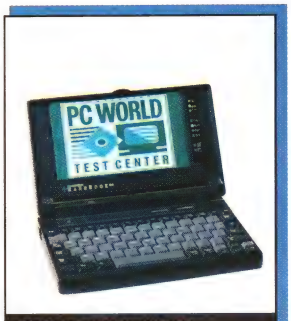
Gateway Handbook DX2-40

PC WORLD TOP 20 5 BUDGET MOBILE PC

PROS: Small; light; long battery life
CONS: No off switch

Want to lighten your load? Gateway 2000's pint-size Handbook isn't much bigger than a Gideon Bible and weighs just 5 pounds ready to go. Configured with 8MB of RAM (20MB is the maximum), this $2295 DX2-40 monochrome subnotebook provides respectable performance, similar to what you would expect from a 486DX-33 notebook.

Battery life is excellent at over 5 hours, and if you're flying across the Pacific, you can always swap in the extra nickel–metal-hydride (NiMH) pack. Power management is fantastic: If you close the Handbook, it suspends your work. The on/off button is actually a suspend/resume switch—a mixed blessing. Starting up where you left off is handy, but when you leave the notebook inactive for extended periods, your battery gradually runs down. Gateway maintains it takes well over a week of inactivity to completely drain the battery, but we like the option of being able to turn our notebook off.



Gateway Handbook

For a subnote, the Handbook DX2-40 has a surprisingly comfortable keyboard, though the keys are crowded. The eraser-head pointing device is positioned above the <Enter> key, with the buttons on the right. The 7.8-inch screen is a concession to the tiny form factor. Gateway provides a PCMCIA Type II slot and throws in a nice carrying case.

Tech support is available 18 hours a day on weekdays and 5 hours on Saturdays. Nice things reputedly come in small packages, and this featherweight is hard to beat for mobility. Although the 130MB maximum hard drive will crowd many Windows users, this subnotebook deserves its number five budget ranking. *Gateway 2000, 800/846-2000* **Reader service no. 744**

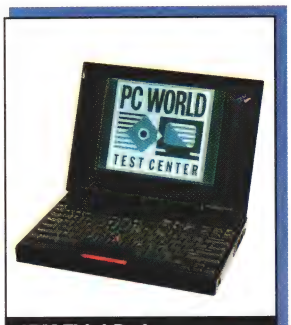
IBM ThinkPad 355

PC WORLD TOP 20 1 BUDGET MOBILE PC
9 POWER MOBILE PC

PROS: Excellent price and battery life
CONS: None

So what you want is a lightweight, high-quality notebook, but you're operating on a really tight budget? IBM's answer to your problem is the ThinkPad 355. This 486SX-33 monochrome system boasts super attention to design, but IBM manages to keep the street price down to just $2099 and traveling weight to a mere 6.6 pounds—a formula that's bound to assure this nifty little unit plenty of attention from thrift-conscious travelers. In fact, more than just budget travelers will be interested in the ThinkPad 355—our number one budget notebook Best Buy—as it also earns the position of number nine on our Power Mobile PCs chart.

The ThinkPad has a basic Windows configuration with 4MB of RAM, a 170MB hard drive, and a 9.5-inch screen. If you're looking for more performance, RAM upgrades all the way to 20MB. Components are easily accessible under the keyboard, which lifts to reveal the modular hard drive, battery, and floppy drive. Just lift out the floppy drive, and plug in one of IBM's DRAM modules. The ThinkPad's trademark eraser-head pointing device is mounted in the center of the crisp keyboard.



IBM ThinkPad

This system performs well as configured. It beat a typical 33-MHz 486 notebook by about 15 percent overall and was remarkably consistent in our individual tests. The NiMH battery lasted 5⅔ hours, among the longest-lived batteries you can find. You even get a lightweight AC converter with retractable plug-in prongs. IBM throws in an integrated fax-modem and a PCMCIA Type III slot.

IBM's service and support is strong: Buyers enjoy a three-year warranty (with a year of on-site service for $40) along with 24-hour toll-free technical support. If you can live with a mono screen, you'll be hard put to find a better value than this Best Buy. *IBM, 800/426-7735*

IBM ValuePoint Performance Series

PC WORLD TOP 20 11 POWER DESKTOP

PROS: Good performance, flexible design, CD ROM drive
CONS: Only one free drive bay

IBM is making a commitment to the DX4-100—and not with a me-too system. This is the first PC we've seen that uses a 50-MHz rather than a 33-MHz system clock, with the CPU functioning as a doubler rather than a tripler. In business applications, this compact provides the fast performance typical of DX4-100s. It comes with 16MB of RAM, a 256K secondary cache, a 540MB hard drive, a CD ROM drive, a sound card, and speakers.

System design is nothing short of ingenious. A VL bus slot on the motherboard provides a connection for a riser card that has either one VL or PCI bus slot along with four 16-bit slots. You can buy a VLB setup now and switch later if you decide you need PCI.

Local bus drive and graphics adapters are integrated, along with the standard I/O ports. The video setup is excellent, with a 2MB S3-based graphics accelerator and a 17-inch monitor supporting flicker-free noninterlaced 75-Hz refresh rates all the way to 1024 by 768 resolution. Nice design touches abound, including a memory upgrade guide and system map pasted to the inside of the case and an available-IRQs list in system setup. The unit provides Enhanced IDE, supporting four IDE devices and hard drive partitions up to 8.4GB. We would have liked to see more than just the one externally accessible drive bay, but three 16-bit slots and one VL bus slot were free in our VL bus system.

IBM ValuePoint

Support is excellent, with a three-year warranty, a year of free on-site service, and responsive 24-hour tech support. At $4168, this system isn't cheap. But its position at number 11 on our Power Desktops Top 20 indicates it's worth the money. *IBM, 800/772-2227*

Introducing The Fujitsu M3099A 100 IPM Duplex Scanner

DOCUMENT IMAGING ON THE DOUBLE.

Double your productivity with the new M3099A duplex document image scanner from Fujitsu.

The M3099A is rugged, high-speed and engineered for dedicated document imaging environments. It offers simplex scan rates of 55 pages per minute. And duplex scan rates up to 100 images per minute for maximum throughput.

What's more, the M3099A comes standard with a 500-page automatic document feeder that keeps production moving. It accepts documents up to 11" x 17" and has user-selectable resolutions from 200 to 400 dpi. Plus, with the Fujitsu IPC II image enhancement option, you can fine tune the quality of your images to meet a wide variety of application needs.

And if you're concerned about budget, then be prepared to get doubly surprised. Because the M3099A is not only backed by one free year of on-site maintenance and Fujitsu's world-class reputation as the industry leader in document image scanners, but it's also one of the most affordable duplex scanners in its class.

So if you want the productivity of a high-speed duplex scanner plus reliability you can count on, get the M3099A. Because when it comes to document imaging, Fujitsu delivers...on the double.

1-800-831-4094

Fujitsu	M3099A
Speed	Simplex: 55 PPM Duplex: 100 IPM
Resolution	200 to 400 dpi 64 step dither
ADF	500 sheets, built in
Interface	Video/RS232C
List Price	$24,995

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Circle 153 on reader service card

THE TOP 20

PC WORLD

MOBILE PCs

1 Gateway ColorBook DX4-75
Speed, screen, and portability—$3495.

New this month · No change from last month · Up from last month · Down from last month

POWER SYSTEMS

		Last month	Months on list	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Gateway ColorBook DX4-75	–	1	95	41	62/85	$3495	DX4-75	8	250
2	Ambra N75D-340	–	1	95	40	62/69	$3448	DX4-75	8	340
3	Acer AcerNote 780cx	–	1	94	40	68/81	$3999	DX4-75	8	340
4	NEC Versa 75EC Notebook	4	2	92	42	62/74	$5000	DX4-75	8	340
5	Gateway ColorBook DX2-50	1	2	91	33	62/85	$2995	486DX2-50	8	260
6	Aquiline Hurricane	–	1	91	45	62/66	$5940	486DX2-66	8	540
7	Toshiba T4700CT 486 Notebook	2	5	91	35	80/78	$4549	486DX2-50	8	203
8	TI TravelMate 4000E WinDX 4/75	3	3	91	38	69/79	$4999	DX4-75	4	455
9	IBM ThinkPad 355	–	1	90	29	75/83	$2099	486SX-33	4	170
10	Compaq Contura Aero 4/33C Model 170	5	2	89	28	83/89	$2448	486SX-33	8	170

BUDGET SYSTEMS

		Last month	Months on list	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	IBM ThinkPad 355	–	1	97	29	75/83	$2099	486SX-33	4	170
2	Compaq Contura Aero 4/33C Model 170	1	2	93	28	83/89	$2448	486SX-33	8	170
3	Toshiba Portege T3400	3	3	91	29	80/78	$2188	486SX-33	8	120
4	Compaq Concerto 4/33 Model 250	2	5	89	24	83/89	$2449	486SL-33	4	250
5	Gateway Handbook DX2-40	–	1	87	27	62/85	$2295	486DX2-40	8	130
6	ZDS Z-Lite 486-25	4	5	86	17	67/80	$1599	486SL-25	4	170
7	TI TravelMate 4000E Win SX/25 Color	6	3	85	19	69/79	$1800	486SX-25	4	129
8	AST Bravo NB	7	3	85	23	66/74	$2335	486SX-33	8	200
9	Sharp PC-8150	11	5	82	23	62/73	$2499	486DX-33	4	200
10	Intelligent EchoPad 486SX-25	10	2	82	17	62/71	$1425	486SX-25	4	125

Best Buy

[1] CA = color active, CD = color dual-scan, CP = color passive, MP = mono passive.

[2] Call 900/903-2972 and use the fax reprint numbers to order fax copies of system reviews. You may order an instant fax of up to 3 individual systems' capsule reviews or 1 capsule plus features table and test reports ($4.95); a complete month's

2 **Ambra N75D-340**
DX4-75, 340MB drive, $3448.

1 **IBM ThinkPad 355**
Light mono SX-33 for $2099.

2 **Compaq Contura Aero 4/33C 170**
Nice color subnote for $2448.

Weight (pounds)	Battery life (hours)	Screen type/size[1]	Vendor contact number	Issue reviewed	Fax reprint number[2]	Comments
7.2	4:28	CD/10.3"	800/846-2000	current	3641	Ideal for near-desktop power on the road. Big, bright color screen.
8	4:46	CD/10.3"	800/252-6272	current	3642	Good presenter's notebook with built-in sound, big color screen, capacious hard drive.
8.2	3:20	CA/9.5"	800/848-2237	current	3643	All-around power notebook with good screen.
8.4	3:20	CA/9.5"	800/632-4636	July 94	3636	Ultimate in versatility; completely modular design allows component switching and easy repair.
7.2	4:29	CD/9.4"	800/846-2000	July 94	3635	Previous no. 1 can't keep up with DX4-75s.
9.2	4:03	CA/9.5"	518/272-0421	current	3644	Fastest notebook we've tested, loaded with features like built-in sound.
8.8	4:02	CA/9.5"	800/334-3445	Apr 94	3603	Great Toshiba service keeps older system in contention.
8	3:02	CA/9.5"	800/527-3500	June 94	3625	Great desktop replacement with huge hard drive, good docking station.
6.6	5:40	MP/9.5"	800/426-7735	current	3645	Also top budget notebook, cheapest on Power list.
5	6:18	CP/7.8"	800/345-1518	July 94	3637	Only subnote on Power list, great for traveling light. Rates no. 2 on Budget chart.
6.6	5:40	MP/9.5"	800/426-7735	current	3645	Great value with good keyboard, TrackPoint pointing device.
5	6:18	CP/7.8"	800/345-1518	July 94	3637	Last month's no. 1 is the top-rated color subnote.
5.8	6:31	MP/8.5"	800/334-3445	June 94	3627	Top monochrome subnote had huge price cut this month.
8.2	6:31	MP/9.5"	800/345-1518	Apr 94	3602	Flexible pen-based system with good battery life.
5	5:06	MP/7.8"	800/846-2000	current	3646	Decent subnote but needs a larger hard drive.
6.2	4:16	MP/8.5"	800/553-0331	Apr 94	3622	Relatively slow subnote earns spot on chart with great price.
8	4:40	CD/8.2"	800/527-3500	June 94	3630	Best value color notebook for all-around use when high performance isn't essential.
7.8	3:08	CD/9.5"	800/876-4278	June 94	3631	One of two fastest budget color notebooks. Solid basic business setup.
8.2	4:09	CD/9.5"	800/237-4277	Apr 94	3607	Big price cut brings it back to Top 20. One of two fastest budget color notebooks.
6.4	2:39	MP/9.5"	800/588-4674	July 94	3640	Cheap monochrome subnote, battery life and performance are mediocre.

review ($9.95 each; April 3004, June 3006, July 3007, August 3008); and a list of all systems tested by the PC World Test Center for the Top 20s ($4.95). Touch-tone phone required. Charges will appear on your telephone bill.

Micron 4100PCI Magnum

PC WORLD TOP 20 8 POWER DESKTOP

PROS: Great DX4-100 performance
CONS: Monitor on the small side for a power system

Shopping for a power desktop on a budget? At $2599, Micron's 4100PCI Magnum almost edges into the budget category while turning in overall performance nearly 10 percent faster than that of the typical Pentium-60. The 4100PCI Magnum has a DX4-100 CPU, a 256K secondary cache, and 8MB of RAM. In addition, you get a 2MB VLB graphics accelerator, a 420MB hard drive, and a CD ROM drive. The only part of this system that smacks of bargain basement is its 14-inch monitor.

Micron 4100PCI

While the CD ROM drive cable and adapter make the interior of this compact desktop appear cramped, there's actually ample room for adding components. Two of the four SIMM sockets remain free, and one VL bus slot and four 16-bit slots are available. You also get two free drive bays, one of which is externally accessible. As an additional incentive, Micron throws in Microsoft's Windows for Workgroups and Works for Windows, along with Diag-Soft's QA Plus.

Micron's one-year warranty is just okay these days, although the company also provides a year of free on-site service. Tech support lines are open every day except Sunday. Some companies pack a lot of value into hardware. Time and again Micron has shown it's capable of putting together a powerful, competitively priced package. The 4100PCI Magnum is no exception, and it places number eight on our Power Desktops Top 20. *Micron Computer, 800/438-3343, 208/465-3434* **Reader service no. 745**

Micron P90PCI PowerStation

PC WORLD TOP 20 7 POWER DESKTOP

PROS: Excellent performance, good expandability
CONS: None

Micron serves up a feast for the power hungry with its new Pentium-90, whose performance marks are among the fastest we've ever recorded. The configuration should satisfy most power nuts: You get 32MB of RAM, a 256K secondary cache, a 540MB IDE hard drive, and a CD ROM drive. Considering the generous helping of memory, $4599 doesn't seem overly steep.

Micron P90PCI

This system offers more than just fine performance: You get a Matrox Ultima PCI graphics accelerator with 2MB of fast VRAM, which provides excellent performance and a wide selection of colors and resolutions. And the 15-inch Mag monitor is certainly a cut above average. Expandability is good, with one PCI and three 16-bit slots free, along with one slot you can use for either a PCI or 16-bit card. The thoughtful motherboard layout makes components easy to reach, and you get three free drive bays (one externally accessible) in the compact box.

Micron's support package is pretty basic: a one-year warranty, with free on-site service provided by GE. This is a fast, very fine system with a real power user's configuration. At number seven on the Power Desktops Top 20, it just misses a Best Buy. *Micron Computer, 800/438-3343, 208/465-3434* **Reader service no. 746**

NMC Pro-System 4100

PC WORLD TOP 20 9 BUDGET DESKTOP
20 POWER DESKTOP

PROS: High performance
CONS: Tech support available weekdays only

Don't be surprised to see this DX4-100 on our Budget Desktops Top 20 chart: You'll probably see more DX4s there soon, along with an increasing number of Pentium-60s. This National MicroComputers compact system is positioned at number nine on our Budget Desktops chart, but in value it's close to the two immediately above it. It's one of the fastest budget desktops on our Top 20 chart—despite the presence of two Pentium-60s—and it earns number 20 on our Power chart.

NMC

Priced at a reasonable $2409, the Pro-System 4100 includes 8MB of RAM, a robust 420MB hard drive, and a 256K secondary cache (upgradable to 1MB). Everything on the motherboard is easy to reach except one memory socket, which requires pushing some cables out of the way. You get five free 16-bit slots and three free drive bays, two of which are externally accessible. And National MicroComputers throws in a combo floppy drive, a 2MB VL bus graphics accelerator, a 15-inch energy saving monitor, and a three-button mouse.

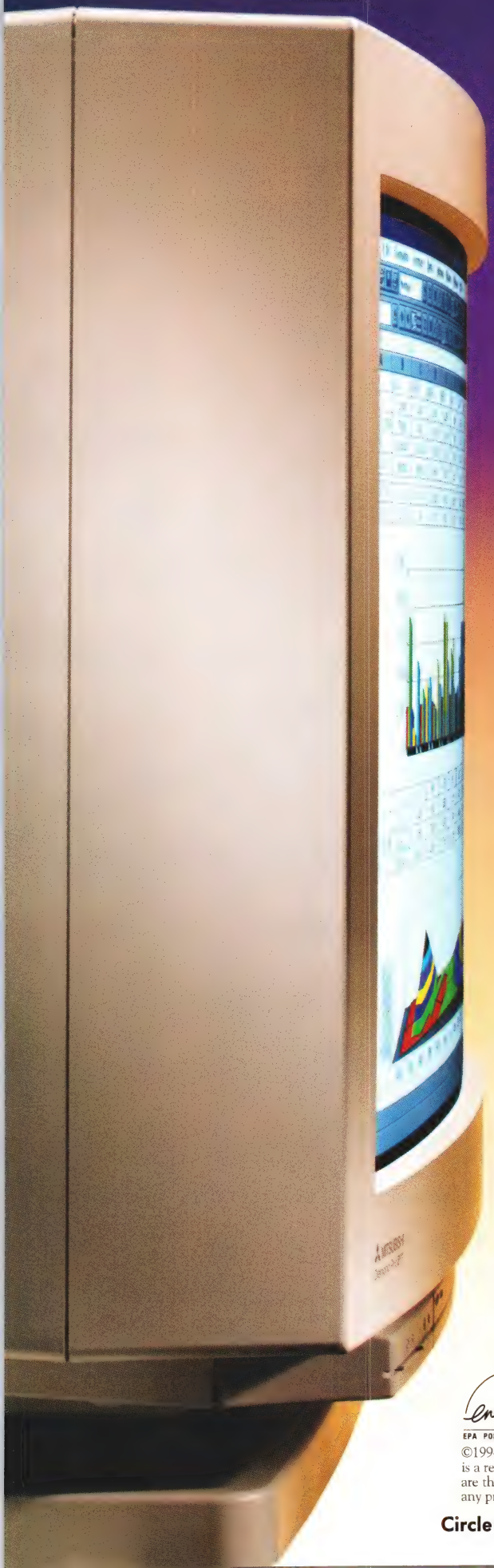
The Pro-System is backed by a one-year warranty on parts, with labor charges covered for two years. A year's on-site service costs a reasonable $39, and the turnaround policy on factory repairs is a single day. But technical support is available just 9 hours a day, weekdays only. If your main criterion in a budget system is speed, this fast, well-designed compact merits serious consideration. *National MicroComputers, 800/424-2983, 801/265-3700* **Reader service no. 747**

Polywell Poly 586-90VIP

PC WORLD TOP 20 9 POWER DESKTOP

PROS: Great performance, competitive price
CONS: Difficulties ironing out IRQ conflicts

The Poly 586-90VIP really flies. The 90-MHz Pentium processor, 16MB of RAM (128MB max), 512K secondary cache, and 4MB VL bus caching IDE hard disk controller add up to an impressive configuration, yielding plenty of horsepower by anyone's standards. The system zipped through our benchmarks, producing fantastic overall scores in a virtual tie with the best we've seen. And with a 540MB hard drive, a Mitsumi CD ROM drive, and a $4200 direct price, this 90 is a solid value for the money. The Poly is the first system we've seen whose motherboard supports



CAN YOU NAME THE MOST ADVANCED MONITOR TECHNOLOGY AVAILABLE TODAY?

Mitsubishi's DiamondTron aperture grille CRT ushers in a new era in high performance monitor design for all high resolution spreadsheet and information intensive windowing applications.

With a big 21-inch screen (20" viewable), the DiamondTron CRT is ideally suited for increasing productivity in demanding business environments.

The Diamond Pro® 21T Featuring
DiamondTron™
A New CRT From Mitsubishi Electronics

The DiamondTron CRT also delivers superior performance. Its new hybrid design incorporates a vertically-flat, square-cornered screen with an aperture grille mask and optical quality coating to minimize glare while increasing brightness. Plus Mitsubishi's proprietary NX-DBF™ (Dynamic Beam Forming) electron gun provides exceptional center-to-corner focus and brilliant edge-to-edge clarity. And the exclusive Diamond Control for Windows™ software lets you easily set up the expanded array of monitor adjustment functions on-screen, including full-power management capabilities for auto-dimming or shut down.

Best of all, you can get all the benefits of advanced DiamondTron technology in our Diamond Pro 21T monitor for just $2,525 MSRP.

For more information about DiamondTron, the Diamond Pro 21T monitor, or Diamond Control, call us at 1-800-843-2515. In Canada, call 1-800-387-9630. *For immediate product specifications, call Mitsubishi Qwikfax at 1-800-937-2094.*

MITSUBISHI
DISPLAY PRODUCTS

energy
EPA POLLUTION PREVENTER

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Circle 188 on reader service card

FEATURES COMPARISON: THIS MONTH'S CONTENDERS—DESKTOPS

Pentium-90s Showing Up Big on the Desktop

● Yes
○ No
n/a = not applicable

	Axik AcePower 586-90V	Compaq Prolinea MT 4/33s Model 270/W	Dell OmniPlex 590	BEST BUY Dell OptiPlex 450s/L	Diamond DT 586-90	DTK Feat-38	IBM ValuePoint Performance Series
Standard features							
Selling price as of 5/4/94[1]	$3898	$2090	$7469	$1957	$2850	$1909	$4168
CPU	Pentium-90	486SX-33	Pentium-90	486SX2-50	Pentium-90	486DX2-66	DX4-100
CPU/upgrade socket	273-pin ZIF	238-pin ZIF	273-pin	238-pin ZIF	273-pin/ZIF	238-pin ZIF	238-pin ZIF
BIOS	AMI 11/11/92	Compaq 9/29/93	Phoenix 3/25/94	Phoenix 3/23/94 v. 1.05	AMI 12-15-93	AMI 8/8/93	IBM SurePath v. 0.02 4/16/94
Installed/maximum RAM (MB)	8/128	8/64	32/192	4/64	8/128	4/256	16/128
30-pin or 72-pin SIMMs	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin
SIMM sockets/number free	4/2	4/3	6/4	4/3	4/2	4/3	4/3
Secondary RAM cache installed/ maximum (K)	512/512	0/128	256/256	128/128	256/512	128/256	256/256
Case style	tower	minitower	desktop	compact	tower	minitower	compact
Free externally accessible 3½-inch/ 5¼-inch drive bays	0/3	0/3	0/1	0/0	1/3	1/1	0/1
Free internal 3½-inch/5¼-inch drive bays	1/2	0/0	0/0	0/0	0/0	1/0	0/0
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots	0/4/0	0/5/0	5/0/0	0/2/0	0/3/0	0/4/0	0/3/0
PCI or VL bus slots/number free[2]	3 VLB/1	0/0	2 PCI/2	0/0	4 PCI/2	3 VLB/1	1 VLB/1
Hard disk	Quantum LPS 540A	Quantum LPS 270AT	Digital DSP-3107L	WD Caviar 1270	Conner CFS420A	Conner CFS210A	Maxtor MXT-540A
Size (MB)	540	270	1070	270	420	210	540
Adapter	4MB Promise DC4030 VL-2 VLB	integrated	integrated SCSI	integrated	expansion card	2MB Promise DC4030 VL-2	integrated Enhanced IDE
Floppy drives (MB)	1.44	1.44	combo	1.44	1.44	1.44	1.44
Graphics adapter	Diamond Stealth 32 VLB	integrated proprietary local bus	integrated PCI	integrated	Genoa Phantom 32i 8900 PCI	Cardex Color Designer A3 VLB	integrated S3 local bus
Installed VRAM/DRAM (MB)	2/0	0/1	0/2	0/2	0/2	0/1	0/2
Monitor	ADI MicroScan 4G	Compaq 151FS Color	Dell VS 15	Dell UltraScan 15ES	Sceptre	ADI MicroScan 3E	IBM 6327
Screen diagonal (inches)/dot pitch (mm)	15/.28	15/.28	15/.28	14/.28	14/.28	14/.28	17/.28
Modem fax/data speed (kbps)	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sound board	○	○	○	Creative Labs SoundBlaster 16	○	○	Jazz 16
CD ROM drive	○	○	NEC CDR-510	Panasonic CDR-563	○	○	Panasonic CR-563
Data transfer rate (K/sec)	n/a	n/a	450	300	n/a	n/a	300
Parallel/serial/mouse/SCSI ports	1/2/0/0	1/1/1/0	1/2/1/0[4]	1/2/1/0	1/2/0/0	2/1/0/0	1/2/1/0
Service and support							
Warranty (years)	1	3	3	3	1.25/2[5]	2	3
30-day money-back guarantee	●	○	●	●	●	○[8]	●
On-site service first-year price	free	free	free	free	free	$50	free
Service center turnaround (days)	2	2	7	7	1	2	○
Daily toll-free phone support (hours)	12	24	24	24	9	9	24
Weekend support	●[9]	●	●	●	○	○	●
BBS	●	●	●	●	○	●	●
Fax	●	●	●	●	●	●	●

[1] All systems priced as configured with DOS 6.0 or later, Windows 3.1, VGA and color monitor, keyboard, and mouse or other pointing device. Selling price is direct or based on vendor estimate.

[2] VL slots also accept 16-bit ISA peripherals.

[3] System provides both VL bus and PCI slots.

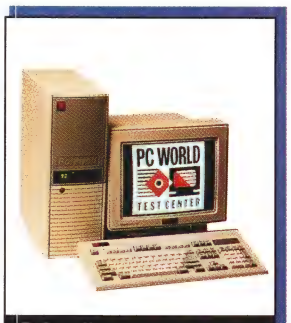
[4] SCSI adapter integrated on motherboard.

[5] Fifteen months parts, two years labor.

	Micron 4100PCI Magnum	Micron P90PCI PowerStation	NMC Pro-System 4100	Polywell Poly 586-90VIP	BEST BUY Zeos Pantera 90
	$2599	$4599	$2409	$4200	$3595
	DX4-100	Pentium-90	DX4-100	Pentium-90	Pentium-90
	238-pin ZIF	273-pin ZIF	238-pin ZIF	273-pin ZIF	273-pin ZIF
	Phoenix A486 v0.10, 1/15/88	Phoenix ver. 4.03, 4/12/94	Award 2/28/94 v.4.50G	AMI Plug and Play 5/2/94	Phoenix 3/2/94
	8/64	32/128	8/64	16/128	16/192
	72-pin	72-pin	72-pin	72-pin	72-pin
	4/2	6/4	4/3	4/2	6/4
	256/512	256/512	256/1024	512/512	256/256
	compact	compact	compact	tower	tower
	0/1	0/1	0/2	1/2	0/2
	1/0	2/0	1/0	2/1	3/2
	0/4/0	0/4/0	0/5/0	0/2/0	0/4/0
	2 VLB/1	3 PCI/2	2 VLB/0	2VLB/1, 4PCI/3[3]	3 PCI/2
	Conner CFS420A	Conner CFA540A	WD Caviar 2420	WD Caviar 2540	Seagate ST3655A
	420	540	420	540	528
	integrated	integrated	VLB DTC 2278VL	4MB VLB DC-680	integrated
	1.44	1.44	combo	1.44	1.44
	Matrox MGA II VLB	Matrox MGA-PCI/2	STB Lightspeed VLB	ATI Mach 64 Pro Turbo	Diamond Stealth 64 PCI
	2/0	2/0	0/2	2/0	2/0
	Micron LX14SOL G	Mag DX15F	ADI MicroScan 4GP	ADI MicroScan 4G	Zeos 15" Color SVGA
	14/.28	15/.28	15/.28	15/.28	15/.28
	n/a	n/a	n/a	n/a	n/a
	○	○	○	○	integrated Business Audio
	Mitsumi CRMC-FX001D	Mitsumi CRMC-FX001D	○	Mitsumi DCS 8630	Mitsumi CRMC-FX001D
	300	350	n/a	300	300
	1/2/0/0	1/2/0/0	1/2/0/0	1/2/1/0	1/2/0/0
	1	1	1/2[6]	1/5[7]	1
	●	●	●	●	●
	free	free	$39	$75	$49
	2	2	1	3	2
	11	11	9	9	24
	●[9]	●[9]	○	●[9]	●
	●	●	●	●	●
	●	●	●	●	●

[6]One year parts, two years labor.
[7]One year parts (two years on motherboard), five years labor.
[8]System replacement only.
[9]Saturdays only.

both the VL bus and the PCI bus *at the same time.* There are two VL bus slots (one free), three PCI slots (two free), and two 16-bit slots (one free), along with a free slot you can use for either a PCI or 16-bit card. The tower case offers six free drive bays (three externally accessible). You get an ATI Mach 64 Pro Turbo graphics accelerator with 2MB of VRAM and a nice 15-inch ADI MicroScan 4G monitor. With all the expansion cards installed, the job of installing another peripheral presents a substantial challenge. Our evaluation unit arrived with a nonfunctional printer port, thanks to an interrupt conflict. Once that problem was ironed out, our performance analyst expended more effort to get an ethernet adapter up and running so she could load our test suite.



Polywell

Polywell fortifies its one-year parts warranty with a two-year motherboard warranty. Labor costs are covered for five years. Phone support is available six days a week, and a year of on-site service costs $75. This unique box packs a lot of wallop, and it deserves its strong number nine ranking on our Power Desktops Top 20. *Polywell Computers, 800/999-1278, 415/583-7222* **Reader service no. 748**

Zeos Pantera 90

PC WORLD TOP 20 — 2 POWER DESKTOP

PROS: Superb performance, great expandability, 24-hour technical support
CONS: None

Mark a new high on the performance chart! Calling the number two power desktop Best Buy Pantera 90 fast would be a grave understatement. This is as good as it gets. The configuration spells power all the way: For a reasonable $3595, you get 16MB of RAM expandable to 192MB, a 256K secondary cache, a 528MB Seagate hard drive, a Mitsumi CD ROM drive—even an integrated 12-bit Business Audio sound feature.

Zeos

Do you need a lot of room to expand? It's there for you in this expansive tower's seven free drive bays; two are externally accessible. The system—like many Zeos machines we've looked at over the years—is beautifully designed and cleanly laid out, with good access to the slots and RAM. You get three free 16-bit slots, one free PCI slot, and a slot you can use for a 16-bit or PCI peripheral. A 64-bit Diamond Stealth graphics accelerator with 2MB of VRAM fills the third PCI slot.

You also get a 15-inch monitor, Windows for Workgroups, and a choice of Lotus's Windows business applications. Zeos's one-year warranty comes with on-site service for $49 a year and 24-hour toll-free tech support. The Zeos Pantera 90 is the ultimate Power Desktop. It's lightning fast, beautifully configured, and priced right. That's what power Best Buy value is all about. *Zeos Int'l, 800/554-5220, 612/633-4591* **Reader service no. 749**

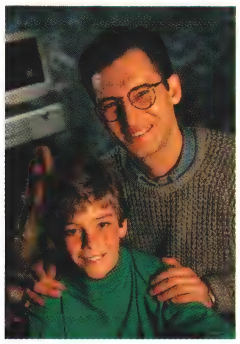
FEATURES COMPARISON: THIS MONTH'S CONTENDERS—MOBILE PCs

Affordable DX4-75s Make a Power Move on the Notebook Scene

● Yes
○ No
n/a = not applicable

	Acer AcerNote 780cx	BEST BUY Ambra N75D-340	Aquiline Hurricane	AT&T Safari 3181	Dell Latitude 433C-170	BEST BUY Gateway ColorBook DX4-75	Gateway Handbook DX2-40	BEST BUY IBM ThinkPad 355
Standard features								
Selling price as of 5/4/94[1]	$3999	$3448	$5940	$4967	$2999	$3495	$2295	$2099
CPU	DX4-75	DX4-75	486DX2-66	486DX2-50	486SX-33	DX4-75	486DX2-40	486SX-33
Traveling weight (pounds)[2]	8.2	8	9.2	8.4	7.4	7.2	5	6.6
Width x depth x height (inches)	11.3 x 8.8 x 2.1	11 x 8.5 x 2	11.5 x 9 x 2.3	11.7 x 9.3 x 2.1	11.5 x 8.8 x 1.9	11.6 x 8.3 x 1.8	9.8 x 5.9 x 1.6	10 x 7.3 x 1.8
Installed/maximum RAM (MB)	8/16	8/20	8/20	12/20	8/20	8/20	8/20	4/20
Secondary RAM cache installed/maximum (K)	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Installed/maximum hard disk (MB)	340/340	340/340	540/540	209/340	170/260	250/340	130/130	170/340
Removable hard disk	●	○	●	●	○	●	○	●
Display type	color active	color dual-scan	color active	color active	color passive	color dual-scan	mono passive	mono passive
Screen diagonal (inches)	9.5	10.3	9.5	9.5	9.5	10.3	7.8	9.5
Maximum colors or gray shades of LCD	256 colors	256 colors	256 colors	256 colors	256 colors	256 colors	64 gray	64 gray
Simultaneous LCD and external monitor	●	●	○	●	●	●	○	●
Highest resolution of external monitor	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	n/a	1024 x 768
Mouse/keyboard ports	1/0[3]	1/0[3]	0/1	1/1	1/1	1/1	1/0[3]	1/0[3]
Cursor keys in inverted T	●	●	●	●	●	●	●	●
Dedicated page control keys	●	●	●	●	●	●	○	●
All 12 function keys dedicated	●	●	●	●	●	●	○	●
Standard <Ctrl> and <Alt> layout	○	○	○	○	●	○	○	●
Built-in pointing device	●	●	●	●	●	●	●	●
Modem fax/data speed (kilobits per second)	n/a	n/a	n/a	n/a	9.6/2.4[4]	n/a	n/a	9.6/2.4
Docking station available	○	●	●	●	○	○	○	○
PCMCIA slot Type II/III	1/0	0/1[5]	0/1[5]	1/0	0/1[5]	0/1[5]	1/0	0/1[5]
Power management								
Supports APM	●	●	●	●	●	●	●	●
Type of battery	NiMH	NiMH	NiMH	NiMH	NiMH	NiMH	NiMH	NiMH
Suspend button	●	●	○	●	●	●	●	●
Suspends when case closed	●	●	●	●[6]	○	●	●[7]	●
Service and support								
Warranty (years)	1	1	1	3	1	1	1	3
30-day money-back guarantee	●	●	●	●	●	●	●	●
On-site/replacement service price for first year	free	$29	$260[8]	free	$199	$100	$100	$40
Turnaround policy (days at service center)	2	3	1	2	2	○	○	3
Daily toll-free phone support (hours)	24	24	9[9]	24	24	18	18	24
Weekend support	●	●	○	●	●	●[10]	●[10]	●
BBS	●	○	○	●	●	●	●	●
Fax	●	○	○	●	●	●	●	●

[1] All notebooks priced as configured with DOS 6.0 or later, Windows 3.1, VGA monochrome or better display, mouse or other pointing device. Selling price is direct or based on vendor estimate.
[2] Includes computer, adapter, and power cord.
[3] Mouse port doubles as keyboard port.
[4] PCMCIA modem.
[5] Alternatively accepts two Type II devices.
[6] LCD off only.
[7] User configurable.
[8] Three years of GE on-site service.
[9] Toll number.
[10] Saturdays only.

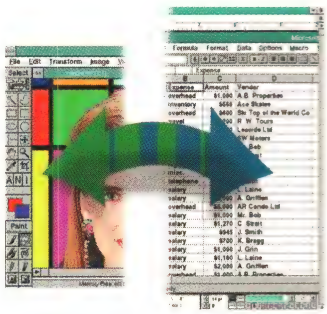


Paul - Manager/Parent :

"I needed a performance boost for my PC. It took a long time for my charts and presentations to appear on the screen. The colors were flat and limited. And my son's games ran slowly. But, I wasn't ready to buy a whole new system.

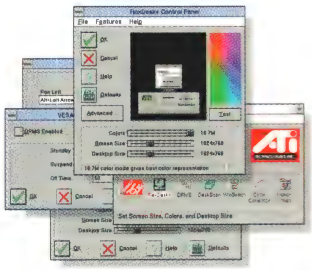
"Fortunately, I got great advice. For *just $299***,* I got ATI's GRAPHICS XPRESSION. It revived my whole system.

"My friend had one. Windows snapped open quickly. Charts popped up on his screen. The *blazing speed,* 37M Winmarks*, was incredible. He said it offered *best value for price/performance.* And the improvement in color graphics and detail were most impressive.



WinSwitch changes color and resolution without leaving Windows

"Then, he showed me the features. WinSwitch allowed him to switch between true color mode or high resolution mode without exiting Windows. And ATI's FlexDesk+ software gave him *total control* over color, desktop size, resolution and even motion video acceleration.



FlexDesk+ easy control of desktop settings

"Finally, he told me it was the only affordable 64-bit accelerator for my ISA system. I rushed out to buy one. *Installation was easy.* There were no switches to set and the software guided me through the installation process. And I was amazed, it even came with a complete set of drivers for Windows, Windows NT, OS/2, CAD and DOS.

"Best of all, my PC now runs much faster in Windows, DOS and games. I almost never see that Windows hour-glass. GRAPHICS XPRESSION. At only $299, it is still great advice."

"I got the advice I needed."

GRAPHICS XPRESSION™

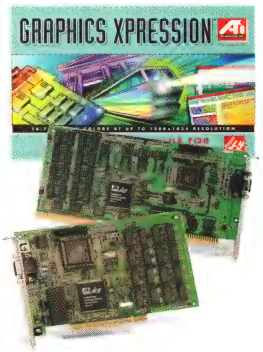
- **Affordable 64-bit Accelerator**
- **Fast 37M Winmarks (4.0)**
- **Best Price / Performance Value**
- **Instant Windows Mode Switching**

NOW SHIPPING!

WINDOWS PERFORMANCE - WINBENCH 4.0*

Outperforms other accelerators in Windows and DOS

- Resolutions up to 1280x1024 non-interlaced
- Full acceleration in 256 to 16.7M colors
- Comes with enhanced driver support for Windows, OS/2 PM, Windows NT, CAD and DOS
- Up to 75Hz refresh rate
- Available for ISA, PCI or VESA Local Bus
- 2MB DRAM memory
- Five year limited warranty
- Priced at only **$299****



mach 64

64-bit Accelerator

ATI TECHNOLOGIES INC.

Perfecting the PC

ATI TECHNOLOGIES INC.
33 Commerce Valley Drive East
Thornhill, Ontario Canada L3T 7N6
Telephone: (905) 882-2600 ext. 4551
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76004,3656

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Circle 5 on reader service card

System Snapshots

These systems, while very capable, don't match the preceding group for overall value in a business environment. However, many of them present unique and valuable solutions to end-user needs.

Compaq Deskpro XE 466

PROS: Excellent documentation and on-line help, three-year warranty
CONS: High price, just one free drive bay

Most users looking for a fast, basic business 486DX2-66 will be satisfied with this PC's performance—the system is approximately 15 percent faster overall in our tests than the typical DX2-66. You get Compaq's top-notch documentation and on-line help, a three-year warranty, and 24-hour tech support. But the $3278 street price is pretty steep, considering that you can buy some Pentium systems—with CD ROM drive installed—for less than $3000 these days.

You get four open 16-bit ISA slots but only a single free drive bay. Still, 8MB of RAM and a 256K secondary cache are ample, and the 500MB hard drive is generous. The 14-inch power-saving monitor strikes us as small for the money, however. Compaq assembles an attractive package, but the overall value of this unit for the price-conscious buyer is diminished by its high price. *Compaq Computer, 800/345-1518, 713/378-8820* **Reader service no. 750**

DECpc LPv+

PROS: Fast, good design
CONS: High price, just one year of free tech support

Nicely designed and configured, the compact DECpc LPv+ provides 8MB of RAM, a 256K secondary cache, a 345MB hard drive, three free 16-bit slots, and two free drive bays. Furthermore, its performance is good for a 486DX2-66. But in today's highly competitive desktop systems market, the $2748 price seems stiff for a DX2-66 with just a 14-inch monitor.

DEC's support policies are good, with a three-year warranty. However, the 12-hour daily tech support is free for just one year. And while the system configuration is typical of a good budget PC, its price puts it in competition with power systems. *Digital Equipment Corp., 800/722-9332, 508/493-5111* **Reader service no. 751**

Dell Dimension 450SV

PROS: Good 50-MHz performance
CONS: Priced too high

This system is based on Intel's new 486SX2-50 clock-doubler, which comes sans built-in math coprocessor. Benchmarks indicate the Dimension performs well, with 8MB of RAM, a 128K secondary cache (256K is max), and a 340MB hard drive. Inside the tall, roomy desktop case, you get three free drive bays, two free VL bus slots, and three free 16-bit slots. The integrated local bus graphics accelerator comes with a minimal 512K of RAM, upgradable to just 1MB. Dell does provide a 15-inch UltraScan 15ES monitor, however.

Dell maintains a high reputation for service and reliability, although Dimensions don't come with the new three-year warranties. You get a one-year warranty, along with 24-hour tech support and a year of free on-site service. When it comes to budget equipment, prices are squeezed so tight that a few hundred dollars one way or the other can make all the difference. So at $2378, this PC doesn't stand out in a budget arena crowded with powerful, low-priced machines. *Dell Computer, 800/289-3355* **Reader service no. 752**

Intergraph TD-3

PROS: 1GB hard drive, CD ROM drive, integrated SCSI and ethernet
CONS: High price, slow for a Pentium-90

The Intergraph TD-3 is designed as a graphics workstation with a very high-end configuration, and $9500 *should* buy a ton of PC. What you get is not chopped liver: a Pentium-90 CPU, 32MB of RAM, a 512K secondary cache, a jumbo 1GB SCSI hard drive, a 2MB Diamond Viper PCI graphics accelerator, a 17-inch .26-dot-pitch monitor, and integrated SCSI and ethernet adapters. There's one EISA, one PCI or EISA, and one PCI slot free. Only one internal drive bay is free, but a quality Toshiba SCSI CD ROM drive is installed.

Performance is pedestrian for a 90, however, with scores uncomfortably close to those of a typical Pentium-66. You get a three-year warranty and 24-hour support. But on-site service costs a mind-boggling $386 a year. Cost is what hurts this system's rating most. *Intergraph, 800/345-4856, 205/730-5372* **Reader service no. 753**

ZDS Z-Station 500

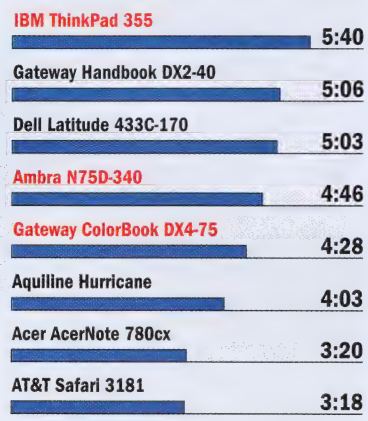
PROS: Good performance, built-in network port
CONS: Inner case flimsy with top off

The Zenith Data Systems Z-Station 500 is an excellent performer in its class. But $3048 is a lot of money to pay these days for a DX2-66 compact unit with 8MB of RAM, a 128K secondary cache, and a 340MB hard drive. ZDS provides a network-ready configuration with an integrated ethernet port. And to ZDS's credit, both the integrated 1MB ATI Mach 32 PCI graphics accelerator and the programmable 15-inch ZDS monitor are fine components.

Expandability is reasonably strong as well, with two free externally accessible 5¼-inch drive bays, plus one PCI and two 16-bit slots free, along with a free slot you can use for either a PCI or 16-bit board. Support policies, while not outstanding, are decent, including a one-year on-site service warranty. This is a solid workstation, well designed and assembled. Only its price puts it out of the running. *Zenith Data Systems, 800/553-0331, 708/808-5000* **Reader service no. 754**

BATTERY LIFE TEST REPORT

IBM Outlasts the Rest



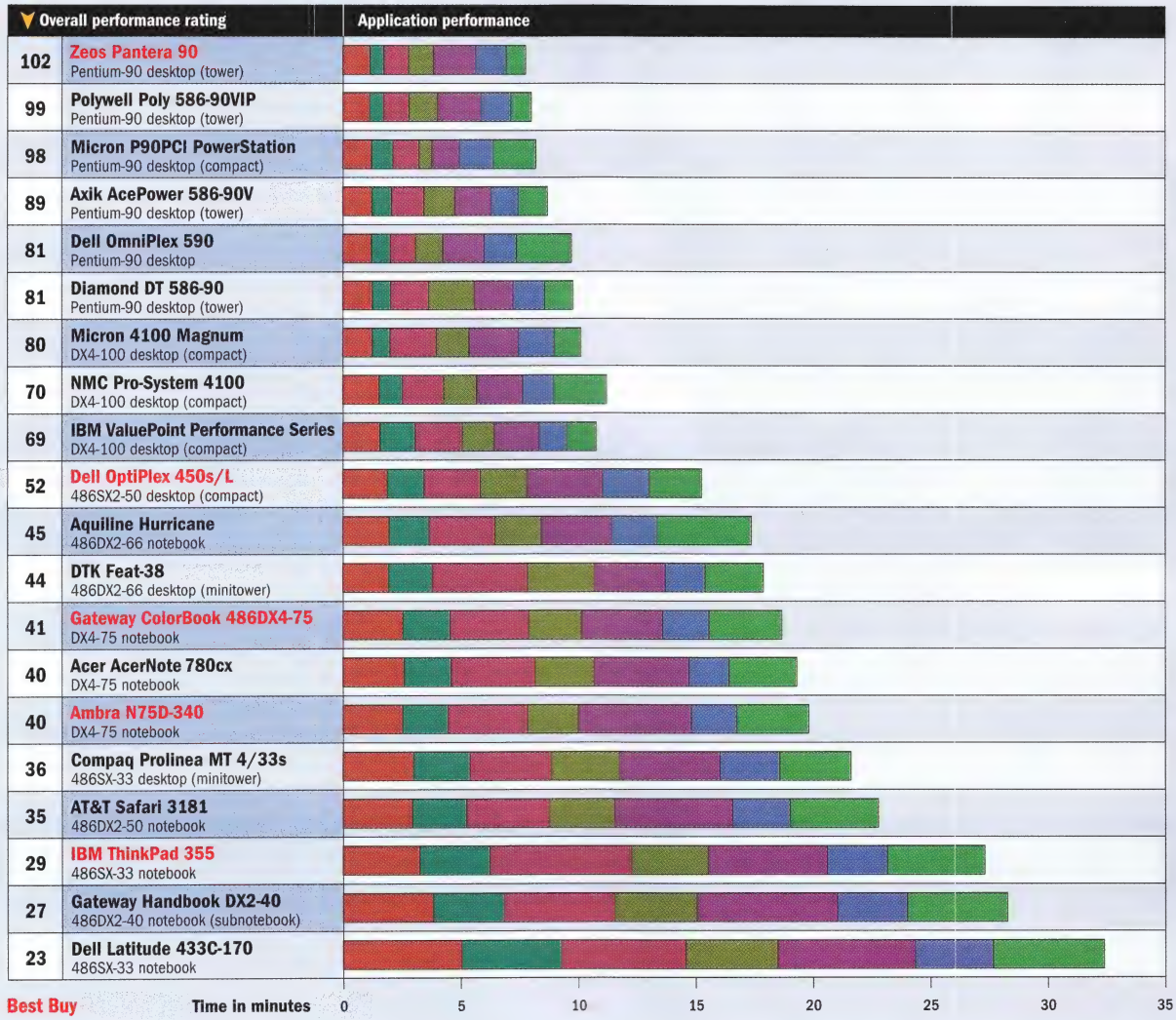
Best Buy

Time in hours:minutes.

Methodology
We drain and fully recharge the battery and set power-saving options to match a consistent profile where possible. Office workers type at regular intervals in Word for Windows, saving periodically. Notebooks are rotated among workers to even the work loads. We report the time elapsed until the notebook shuts itself off.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Pentium-90s Sweep Ahead



Systems are arranged in order of overall performance from best to worst, based on the total of the scores from seven normalized, weighted tests. However, slower performance by a system in one test may cause its overall bar to be longer than that of a system with worse overall performance.

Methodology
We tested each system as supplied by the manufacturer. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set video resolution to 800 by 600 pixels in 256 colors, using the supplied video driver where possible. We loaded the test applications and files and test automation software and scripts.

Word 2.0 for Windows
We worked with 1-, 9-, and 28-page business documents. Operations included creating, saving, opening, scrolling, editing, checking spelling, formatting, previewing, and printing.

Excel 4.0
We opened a file and performed several data extracts, entered new data, altered calculations, formatted, scrolled, moved blocks, previewed, printed, and saved.

Paradox 1.0 for Windows
We used a custom form to add a number of records to an existing table, performed several queries, and generated a report.

Freelance 1.0 for Windows
We built a six-page presentation using a standard template, clip art, text, and charts; applied several views to the presentation; and previewed and saved it.

WordPerfect 6.0 for DOS
We performed a variety of editing, formatting, previewing, and printing tasks on documents ranging from a single-page memo to a long report. Due to memory requirements, the amount of free memory for DOS in the first 640K dramatically affects this test.

1-2-3 release 3.4 for DOS
Using the graphical Wysiwyg add-in and working in three different files, we created and altered formulas, built graphs, saved, and printed.

Paradox 3.5 for DOS
We tested Paradox 3.5 running under Windows in a DOS window. We entered data, searched records, updated, and generated reports from a simple customer list.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Let's talk scanned image quality.

Test 1

COLOR REGISTRATION ACCURACY

MICROTEK SCANMAKER IISP

A good test for RGB color registration is to scan black and white line art in RGB color mode. When magnified and displayed on the monitor you should not see red, green or blue pixels, only gray and black. Microtek's ScanMaker IISP image on the left shows no red, green or blue pixels. Hewlett Packard's ScanJet IIcx, however, shows too many red, green and blue pixels.

BEFORE YOU BUY ANY SCANNER, TAKE A GOOD, HARD

Before you lay down your hard-earned bucks for a single-pass color desktop scanner, here's a simple test you can perform to see for yourself how well it handles color registration.

Scan black and white line art in RGB color mode. Then enlarge and examine the results.

If the colors are properly aligned — or "registered" — the lines will look black. If you see dots of red, green or blue at the edge, the scanner's color registration leaves something to be desired.

SEE FOR YOURSELF.

In a recent direct comparison between the Hewlett-Packard ScanJet IIcx and the Microtek ScanMaker IISP, the ScanMaker clearly shows superior color registration. The H-P ScanJet IIcx, well, leaves something to be desired. And because poor registration is only one factor that causes inaccurate color, it further degrades color quality when accuracy problems already exist. So color registration is only one of the quality checks you should be making if you want the best scanner for your money.

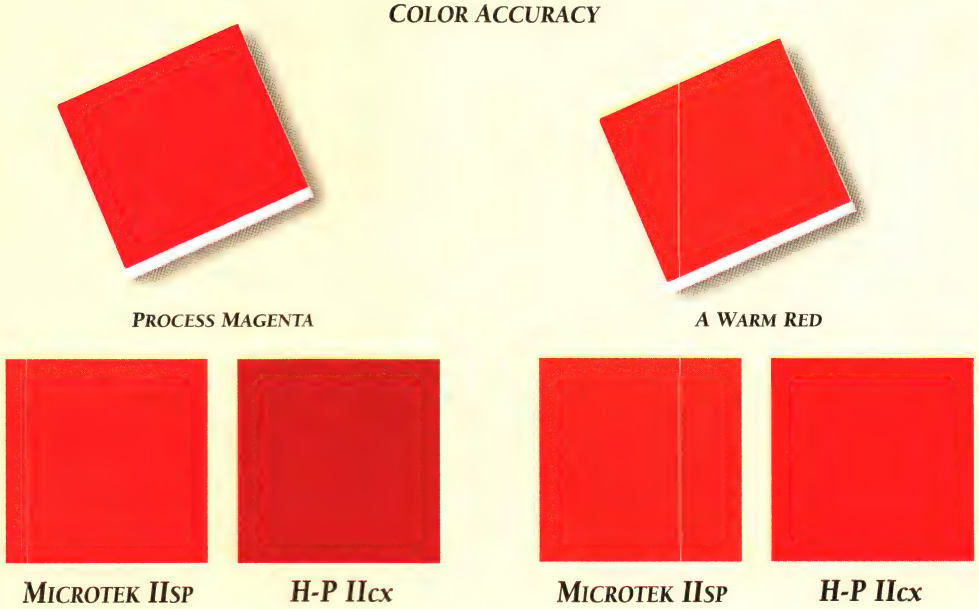
Another is color accuracy — how close does the color of the scanned image come to the color of the original? The Microtek ScanMaker IISP uses an award-winning system called Dynamic Color Rendition (DCR) which automatically calibrates and

The scanner to ask for, **Microtek's ScanMaker IISP**, *comes complete with Adobe Photoshop LE for Windows or Macintosh and the DCR color calibration/correction system including software and an IT-8 calibration target. Shown with optional Transparent Media Adapter. Optional Automatic Document Feeder also available.*

Test 2

COLOR ACCURACY

H-P SCANJET IICX



Color accuracy is important in most of the images we scan. To test color, we scanned color swatches from an industry standard color-matching system. Once again, Microtek's ScanMaker IISP easily outclassed the well-known ScanJet. The disparity is even more apparent when the Transparent Media Adapter is used. H-P's stationary "light table" light source results in uneven accuracy, while Microtek's moving light source gives consistently more accurate color.

LOOK AT REGISTRATION AND COLOR ACCURACY.

corrects colors to make them virtually indistinguishable from the original.

To prove it, we scanned a 100% magenta color swatch on the ScanJet IICX and the Microtek ScanMaker IISP. The results, as you can see, show the ScanMaker IISP's color accuracy is superior to H-P — or anyone else. In fact, in a scanner comparison published in the February 8th edition of *PC Magazine*, the editors said, ***"...the ScanMaker IISP's color output was clearly the best of any scanner in our survey."***

PC MAGAZINE EDITORS' CHOICE™
February 8, 1994
Microtek ScanMaker IISP

SOMETHING ELSE H-P CAN'T SAY.

Hewlett-Packard makes some great printers. They also make computers and a host of other electronic equipment.

Microtek makes scanners. Period. In fact, Microtek pioneered desktop scanners. So our history with scanners is longer and deeper than anyone else you can name. Including H-P.

DON'T BUY A SCANNER UNTIL...

If you're considering a scanner — anybody's scanner — don't write the check until you've seen the Microtek ScanMaker IISP. For your free copy of *The Scanned Image* (an easy introduction to scanners), more information or to find out where to see the IISP for yourself, call us at **800/654-4160** or fax a request to 310/297-5050.

MICROTEK
Better Images Through Innovation.

Before you buy a scanner, let's talk.
800/654-4160

The following are trademarks or registered trademarks of their respective companies: H-P, Hewlett-Packard, ScanJet of Hewlett Packard Company; Microtek, ScanMaker and DCR (Dynamic Color Rendition) of Microtek Lab, Inc.; Adobe Photoshop LE of Adobe Systems.
Prices and software bundles are subject to change. Test results may vary with specific company products. SM11SP-PCW-894

Circle 195 on reader service card

Win a Polywell Poly 486/40DX

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Polywell Poly 486/40DX, a Best Buy AMD 486DX-40 featured in this month's PC World Top 20.

HOW TO ENTER: Fax your completed questionnaire to *PC World* at 415/974-7367. If you have trouble connecting to this number, fax your survey to 415/974-7404 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 8-SS, *PC World,* 501 Second St. #600, San Francisco, CA 94107-1496. Send your survey in no later than August 31.

HOW TO FILL OUT THE FORM: Clearly print your name (use block capital letters) and your fax number at right; fill the appropriate circle for each digit of your daytime phone number. Then fill out the rest of the questionnaire. WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person per month. Void where prohibited by law.

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Ambra ○ Aqualine ○ Ares ○ AST ○ AT&T (NCR) ○ ATronics ○ Austin ○ Axik ○ Blackship ○ CAF ○ Canon ○ Compaq ○ CompuAdd ○ Compudyne ○ Comtrade ○ DEC
○ Dell ○ Diamond ○ DTK ○ Dual ○ Eltech ○ Epson ○ Ergo ○ Everex ○ Gateway 2000 ○ Hertz ○ Hewlett-Packard ○ Hyundai ○ IBM ○ Inmac ○ Intelligent ○ Insight ○ Leading Edge ○ Micro Express ○ Micron
○ Microsource ○ Midwest Micro ○ MIS ○ Mitac ○ NEC ○ National Micro ○ Netis ○ Northgate ○ Packard Bell ○ Panasonic ○ PC Brand ○ Pionex ○ Polywell ○ Quantex ○ Samsung ○ Other (Specify first 7 letters)
○ Sharp ○ Shasta ○ Swan ○ Tagram ○ Tandy ○ Tangent ○ Texas Instruments ○ Toshiba ○ Tri-Star ○ USA Flex ○ VTech (Expotech, Laser) ○ Winbook ○ Zenith (ZDS) ○ Zeos ○ No-name clone

Is this PC a...?
○ Desktop ○ Notebook/laptop ○ Hand-held

Is the CPU a...?
○ Pentium ○ 80486 ○ 80386 ○ 80286 ○ Other (specify): _____

Where did you buy this PC?
○ Local dealer ○ Mail/phone order ○ Direct from field sales force ○ Membership discount store ○ Computer superstore ○ Home/electronics store ○ Retail store ○ VAR ○ Other (specify): _____

When did you buy this PC?
○ This month ○ 1–3 months ago ○ 4–6 months ago ○ 7–12 months ago ○ More than 12 months ago ○ Not sure

Would you buy this brand of PC again?
○ Yes ○ No

If you bought your PC by mail or phone, how long after you ordered it did it arrive?
○ Less than 1 week ○ 1–2 weeks ○ 3–4 weeks ○ More than 4 weeks

WHAT ARE YOU REPORTING? (Check only one.)

○ No problems ever
○ No problems since last responded to survey
○ A problem since last responded to survey
○ An older problem not previously reported in survey

If you're NOT reporting a problem, please fill out the Uptime Report (below).

To REPORT a problem, fill out the Problem Report (right column).

UPTIME REPORT

How many consecutive months has your PC been trouble-free?
○ 3 months ○ 6 months ○ 9 months ○ 12 months ○ 15 months ○ 18 months ○ More than 18 months

■ **STOP HERE if you're not reporting a problem.**

PROBLEM REPORT

When you first received your NEW PC, was any component "dead on arrival"?
○ Yes ○ No ○ Don't know

If so, which one was it? (Check all that apply.)
○ Battery ○ CD ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

■ **For the following questions, describe your most recent HARDWARE-related problem with this PC.**

Did you contact the manufacturer for repair service or technical support?
○ Yes ○ No ○ Not sure

What was this problem finally identified as?
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral
○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Check all that apply.)
○ Battery ○ CD ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

How many times have you had a problem with this PC?
○ This was first time ○ Two ○ Three ○ Four ○ More than four

Did the problem occur under warranty?
○ Yes ○ No ○ Not sure

How recently did this problem occur?
○ This month ○ 1–3 months ago ○ 4–6 months ago ○ 7–12 months ago ○ More than 12 months ago ○ Not sure

How long after PURCHASE did this problem occur?
○ Less than 1 month ○ 1–3 months ○ 4–6 months ○ 7–12 months ○ More than 12 months ○ Not sure

■ **For the following questions, describe your most recent SERVICE or SUPPORT experience.**

What type of service/support did you receive?
○ Phone ○ On-site ○ In-store help ○ Express system swap ○ Express component swap ○ Factory return

If phone service, how long were you on hold?
○ Not at all ○ Less than 1 min. ○ 1–2 min. ○ 2–5 min. ○ 5–10 min. ○ 10–20 min. ○ More than 20 min.

How long did it take before you talked to the person who finally helped you?
○ Less than 1 hour ○ 1–24 hours ○ 1–2 days ○ 3–5 days ○ 1 week ○ More than 1 week

How long did it take to resolve the problem completely?
○ Less than 1 week ○ 1–2 weeks ○ 3–4 weeks ○ More than 1 month ○ Never resolved

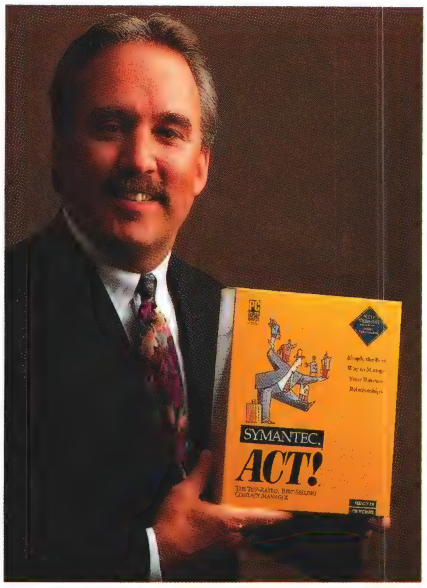
Was the problem resolved to your satisfaction?
○ Yes ○ No

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied were you with the service and support you received?
○ 1 ○ 2 ○ 3 ○ 4 ○ 5
Not at all — Satisfied — Extremely satisfied

How likely is it that you would recommend this brand of PC to a friend or colleague?
○ 1 ○ 2 ○ 3 ○ 4 ○ 5
Not at all — Likely — Extremely likely

PLEASE FAX TO 415/974-7367



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PC MAGAZINE EDITORS' CHOICE
ACT! for Windows 1.1 August 1993

"There's good reason for ACT!'s on-going dominance of the contact management field."
PC Magazine, Editors' Choice Award, August, 1993

HomeOffice COMPUTING FOUR STARS

"ACT!, on any platform, was the clear winner."
Home Office Computing, 4-Star Award, February, 1994

"The productivity in our office has increased 3 to 4 times with ACT! 2.0 for Windows. Because we can share contacts, documents and activities on the network, what used to take 10 steps now takes only two."
Keith Gasner, IDS Financial Services

"It's a powerful management tool that keeps me organized and on track."
David Florence, Market Development Mgr., Motorola

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NEC 4FGE
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ESTIMATED RETAIL PRICE $799	ESTIMATED STREET PRICE $755
THIS MONITOR HAS A LOT OF CONCERN FOR THE ENVIRONMENT (GREEN ENERGY–EPA ENERGY STAR, VESA DPMS, NO CFC, SWEDAC MPR II).	THIS MONITOR HAS IT, TOO. (EPA ENERGY STAR, VESA DPMS, SWEDAC MPR II).
THIS MONITOR HAS A LOT OF DISPLAY AREA (118 SQUARE INCHES),	THIS MONITOR HAS A LOT LESS. (27 SQUARE INCHES LESS).
AND THIS MONITOR HAS A 0.26MM DOT PITCH, AND A 1280 X 1024 MAXIMUM RESOLUTION,	THIS MONITOR HAS NEITHER.
WHICH MEANS WHILE THIS MONITOR HAS ENORMOUS RESPECT FOR YOUR WALLET,	THIS MONITOR DOES NOT.
THAT'S WHY THIS MONITOR SHOULD ALSO APPEAL TO YOUR SENSE OF RESPONSIBILITY AND VALUE.	AND THIS MONITOR SHOULD NOT.

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Circle 169 on reader service card

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Top 10 Windows Accelerators: ATI Grabs the Speed Crown

A revolution is under way in the realm of graphics boards, and it's bringing new features such as enhanced full-motion video playback, sophisticated software utilities, and fast 64-bit designs. To help you get along under the new regime, we've revised our Top 10 rating system.

For example, we now track new standards such as the VESA Advanced Feature Connector (VAFC), which lets a graphics board accept high-resolution video from a separate video board. We also consider compatibility with the VESA Media Channel (VMC), since a VMC connector enables boards to accept video from 15 VMC-compliant data sources—vital for video playback and teleconferencing applications. Currently, boards from Matrox and Number Nine are among the few that offer VAFC or VMC capability, though others may offer proprietary designs to link graphics and video. We've also revised our value weighting system to put more stress on key areas like ease of use and compatibility.

The new ATI Graphics Pro Turbo achieved the best PC World WITS score ever.

The revised rating system shook up our Top 10, ushering some new products to the top. The Boca Voyager surged into the number two spot with a $145 price that makes it the least expensive board on the charts. Returning to the list are the number four Hercules Dynamite Power VL and the number ten ATI Graphics Ultra Pro.

The one new board we tested this month is the ATI Graphics Pro Turbo—the 64-bit successor to the popular Graphics Ultra Pro. The PCI version of this board achieved the best overall *PC World* WITS score ever, edging out the Number Nine GXE64 Pro (not shown in the chart) for the performance crown. Also available in ISA and VL versions, the Graphics Pro Turbo features enhanced video playback for expanding standard video windows and software for installing drivers and managing the display. It also features on-the-fly resolution and color switching, though Windows requires the board to resort to some trickery to do so. With ATI's WinSwitch color switching on, the board actually runs in its 24-bit color mode while simulating lower color settings—an imperfect process that resulted in muddy images in 256-color mode in our tests. Otherwise, Graphics Pro Turbo impressed us with its performance and software.

WITS was developed by Jon Peddie Associates, a consulting firm specializing in PC graphics technology. Jon Peddie and Fred Dunn are the principal officers of Jon Peddie Associates.

TOP 10 ACCELERATORS

New this month
Up from last month
No change from last month
Down from last month

		Overall value	Estimated street price	Windows Integrated Test Suite scores: Word 2.0 for Windows	Excel 4.0	CorelDraw 3.0	Photostyler 1.1	QuarkXPress 3.11	Freelance Graphics 3.01	Bus type	RAM (MB/type)[1]	Chip/driver date	Reader service number
1	Diamond Stealth 32[2] 800/380-0030	90	$249	13.6	15.5	13.3	11.5	12.2	6.0	PCI	2 / D	ET4000/W32p 12/29/93	721
2	Boca Voyager 407/997-6227	88	$145	12.8	13.2	12.6	11.6	13.7	4.9	VL	1 / D	F64300 1/14/94	722
3	Hercules Dynamite Pro VL[2] 800/532-0600	86	$210	12.3	13.8	12.6	11.5	15.3	5.7	VL	2 / D	ET4000/W32p 9/14/93	723
4	Hercules Dynamite Power VL 800/532-0600	85	$237	12.8	14.2	12.9	11.5	14.2	5.8	VL	2 / D	ET4000/W32p 12/1/93	723
5	Orchid Kelvin 64 800/767-2443	84	$275	12.2	13.4	13.1	11.9	14.1	4.3	VL	2 / D	GD5434 1/24/94	724
6	ATI Graphics Pro Turbo 905/882-2600	83	$450	13.3	16.8	14.4	10.0	16.5	6.2	PCI	2 / V	88000GX 4/11/94	725
7	Number Nine #9GXE64 800/438-6463	83	$275	11.8	13.8	8.9	11.7	13.2	5.7	PCI	2 / D	Vision864 2/2/94	726
8	Hercules Graphite Power VL 800/532-0600	83	$340	12.5	14.3	12.5	11.5	14.1	4.0	VL	2 / V	AGX016 2/13/94	723
9	Matrox MGA Ultima PCI[2] 800/361-1408	82	$442	14.6	18.8	12.3	11.2	14.2	3.7	PCI	2 / V	MGA 64 1/11/94	727
10	ATI Graphics Ultra Pro 905/882-2600	82	$330	12.3	13.1	10.9	11.4	12.8	4.5	VL	2 / V	68000 11/4/93	725

Methodology Boards were tested on a 486DX2-66 system with 16MB of RAM and 256K of secondary cache. Application scores are the factor by which a board exceeds our baseline system, an unaccelerated ET4000-based VGA adapter on a 386DX-25 with 16MB of RAM. All boards are tested at 1024 by 768 resolution at 256 colors and a minimum 70-Hz refresh rate. The overall value score combines ratings of overall performance, estimated street price, and product features. For all scores, higher is better.

[1] D is DRAM; V is VRAM.
[2] Similar value offered by other bus version tested.

For more information about all products in this table, circle reader service no. 904.

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Concerto Features:

25MHz 486SL (DX) (33MHz available), 4MB RAM (upgradable to 20MB)
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Convenient Pointing Device
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◈
2 PCMCIA Type II slots (or single Type III)
◈
Preinstalled MS-DOS® 6, MS-Windows,™ PenPower for MS-Excel, InkWare NoteTaker, and TabWorks®

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9.5" Monochrome VGA or 9.5" Color Advanced Passive VGA Display
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intel inside

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4MB RAM (upgradable to 64MB)

340MB Hard Drive

3.5" Diskette Drive

Local Bus Graphics with 1MB

14" SVGA Color Monitor (1024 x 768)

Preinstalled MS-DOS 6, MS-Windows 3.1, and TabWorks

Preinstalled Multimedia Solution Paq available.

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Enhanced performance with greater affordability. $1,475 *Or $53 per month**

Multimedia Solution Paq℠

With SoundBlaster 16-bit sound board, internal dual-speed CD-ROM drive, external stereo speakers, microphone & multimedia software. Starts at $499.

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200MB Hard Drive

3.5" Diskette Drive

Local Bus Graphics with 1MB

14" SVGA Color Monitor (1024 x 768)

Preinstalled MS-DOS 6, MS-Windows 3.1, and TabWorks.

Preinstalled Multimedia Solution Paq available.

Compaq ProLinea Net1/25s

An ideal choice if you're looking for excellent performance at an affordable price. The all-in-one styling saves desktop space and makes setup as simple as plugging the unit in. TabWorks, a Compaq exclusive, is preinstalled for greater ease of use. Network-ready and ideal for peer-to-peer communications.

$1,249 *Or $45 per month**

ProLinea Net1/25s Features:

25MHz 486SX (upgradable to 486DX2/66)

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3.5" Diskette Drive

Built-in 14" SVGA Color Monitor (1024 x 768)

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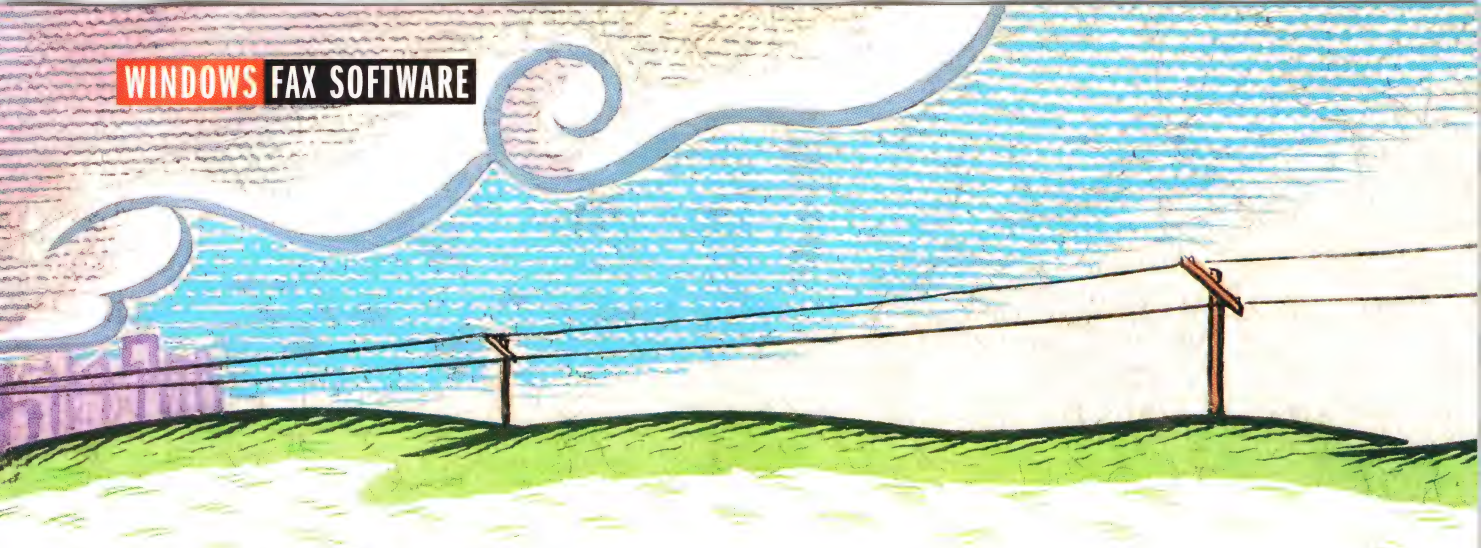


PC Faxing

Convenient but...

Is it time to trade in your fax machine for PC fax software? Here's the hard copy on six leading programs we rated for performance, flexibility, and ease of use.

Remember when fax was supposed to be the ultimate in instant document delivery? The irony is that faxing has become so popular that there are many more people who want to send faxes than machines to fax from, which means documents often sit around for a while before they're faxed. And just try sending faxes in volume. Hand your receptionist or mail clerk a sheaf of pages to send to a dozen people, and he or she throws you surly glances, muttering "Fed Ex" sotto voce. Ask to send the same stack to 50 people, and you risk mutiny in the mailroom.

Enter the PC-based fax system. With a fax-modem and one of the programs reviewed here, you get the instant gratification that fax technology originally promised; just open the document you want to send and "print" it to your fax-modem. And it takes just a few minutes to send a fax to a group of people. Simply pick the recipients from the fax program's phone book, click the Send button, and off they go. If you want to wait until phone rates are lowest, you can schedule faxes to transmit late at night. Some newer fax machines offer scheduling and broadcast capabilities, but they are

By Patrick Marshall

TIM GRAJEK

LISTINGS

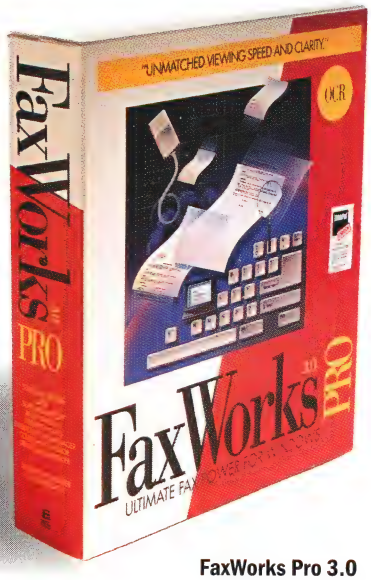
not nearly as flexible and easy to use as fax software. Faxes from PCs also look much crisper and cleaner.

Computer fax systems allow you to do more with incoming faxes. You get an electronic record of all your fax traffic. And if you want to incorporate material from a fax into, say, the company report you're writing, most fax software includes an optical character recognition (OCR) software module that can turn the fax into text you can edit in your word processor. Even better, some of the top fax programs let you manage your E-mail and faxes together. While we review only stand-alone fax programs here, you can get many of the same features on a PC-based network fax server program.

Easing Fax Frustration

So why are fax machines still around? Two drawbacks have kept computer fax systems from supplanting the fax machine: the difficulty of getting existing paper documents into the program and—more important—steep learning curves. Our test center found that most programs didn't adequately explain some of their more esoteric features—notably, text recognition—and that fax programs have far to go in ease of installation and of use, but we have found great improvements in this area (see "Real World Testing: Putting Fax Software on Trial"). Most programs automatically detect your modem, its peak speed, and the COM port to which it is attached. We're also starting to see more sophisticated help systems in fax software.

Ease of learning and of use are so important that they figured prominently in our decision to award SofNet's FaxWorks Pro 3.0 a Best Buy. Even though FaxWorks Pro was not particularly feature-rich, it was clearly the easiest product to learn and use. We awarded the other Best Buy to Delrina's WinFax Pro 4.0, by far the most powerful program in the group.



FaxWorks Pro 3.0

Fax software is quite affordable—the packages range from $49 to $129. If you've decided you need computer faxing, you'll have to consider several feature categories.

Modem Support

Does the fax software have extensive modem support? Fortunately, all the programs reviewed here support both the Class 1 and the Class 2 PC fax standards, as well as the Intel-promoted CAS protocol, which is disappearing from business-class fax-modems. Class 2 modems have the capability to carry out some of the data-handling and communications chores that are managed by the computer under the Class 1 standard. Often the most noticeable result of switching to Class 2 is smoother background operation. But you need to keep in mind that few software packages support all the same features for both classes. And while earlier Class 2 modems and software often didn't see eye-to-eye, recent products match up much more smoothly.

WinFax Pro 4.0

Best Buys

Two Best Buys emerged this month, one for the new user and one for the power user. The author and testers agree that FaxWorks Pro 3.0 has a solid feature set and is by far the easiest program to learn and use, and it earned a Best Buy based on that strength. The testers particularly liked FaxWorks Pro's cue cards, which pop up when you have the mouse pointer on an icon or tool. The program is ideal for the neophyte who wants to get up and running quickly with a minimum of muss and fuss.

WinFax Pro 4.0 is the clear choice for the power user. Its incredible feature set, including unique capabilities such as remote access and strong E-mail integration, overshadows those of the rest of these packages. It also has the most flexible and customizable interface we've ever seen. In short, WinFax Pro 4.0 defines the state of the art in stand-alone fax software.

Baby, You Send Me

Any fax program worth its code allows you to schedule faxes for later transmission. If you rely heavily on faxing you'll want forwarding, which lets the program redirect faxes to wherever you are. WinFax Pro has a remote fax-retrieval feature.

If you have a lot of outgoing fax traffic, and especially if you are short on disk space, look for a program that can automatically delete faxes after transmission. Need the fax to arrive in the best possible shape? Error-control methods such as ECM (Error Control Mode), found on WinFax Pro and on some conventional fax machines, improve the integrity of the fax. UltraFax and WinFax Pro let you attach a binary file—say, an Excel file with a document. Error control and binary attachments require that you be connected to a compatible fax system.

You can send a fax from any Windows application by selecting the fax program's driver as the active printer. However, not only is this unintuitive, it's inconvenient, because you have to remember to reset your printer as the active printer after the fax is sent. As a result, most of these fax programs offer macros for popular Windows programs that allow you to fax directly, without changing printer drivers. Also, all except UltraFax let you write macros for whichever programs you want to fax documents from. All except datafax+ let you scan in a file and send it in one process.

Automatic receive modes and background reception are standard features of fax programs, but you'll find that some programs let you do more than others once the faxes arrive. You can configure each of the programs here to print received faxes automatically, but while all have OCR, not all the programs automatically forward or perform text recognition on received faxes.

Spiffing Up Your Documents

Once you receive the fax, what can you do with it? You may want to edit a received fax—for example, edit a draft or put your signature on a contract. All programs offer drawing and text tools for marking up faxes before printing or forwarding them and WinFax Pro even comes with handy electronic stamps, such as *Urgent* or *Confidential*.

All the fax programs except BitFax Professional let you customize cover sheets to some extent; all let you insert a logo, and half let you insert variables such as date and time.

Many of the greatest differences among these programs lie in their fax management capabilities. Some of them let you create folders for storing faxes; others don't. Some offer utilities for compressing faxes into archives to economize on disk space; others don't. Some provide extensive search tools; others make you manually search folders and logs (preexisting folders for sent and received faxes). All, however, contain OCR. Unfortunately, OCR is a neat idea whose technology hasn't quite arrived. Even vendors concede that few users make much use of the capability, mainly because it's too inaccurate. The newer fax programs are providing faster, truer text recognition, however.

All the programs offer multiple phone books for saving names and numbers, and all let you create groups of contacts so you can fax to the entire group in a single action. In addition, nearly all let you search the phone book for quick retrieval—useful if you have hundreds of names to wade through. What if you already have your contacts' names and numbers stored in a PIM, database file, or other source? Simply export those records using an appropriate format and import them into the phone book. Faxing from a hotel room? All but UltraFax let you add your credit or calling card number in the dialing string.

A Fax for Every Foible

If you spend a lot of time working in DOS applications, you should pick a package that can send and receive faxes in DOS. Also, if you have data needs, you'll want to take a look at one of the integrated communications packages such as BitFax Professional, which we fully review here. See "Fax of the Future: Part of a Unified Communications Solution" for a discussion of Mustang Software's Qmodem Pro 1.10, Delrina's Communications Suite, and Traveling Software's CommWorks. These four products offer fax and general data communications in a single package.

The bottom line on fax programs? While you won't find all the available features in one program, chances are you'll find a program here that closely matches your particular needs. Whichever one you choose, you'll be getting an increasingly valuable partner, or even replacement, for the standard fax machine.

Patrick Marshall is a contributing editor for InfoWorld *and president of Cascade Information Technologies, a Seattle consulting firm. Dean Andrews is manager of usability testing for the PC World Test Center. Usability testing by Dean Andrews, Rose Cowden, Ulrike Diehlmann, and Greg Smith.*

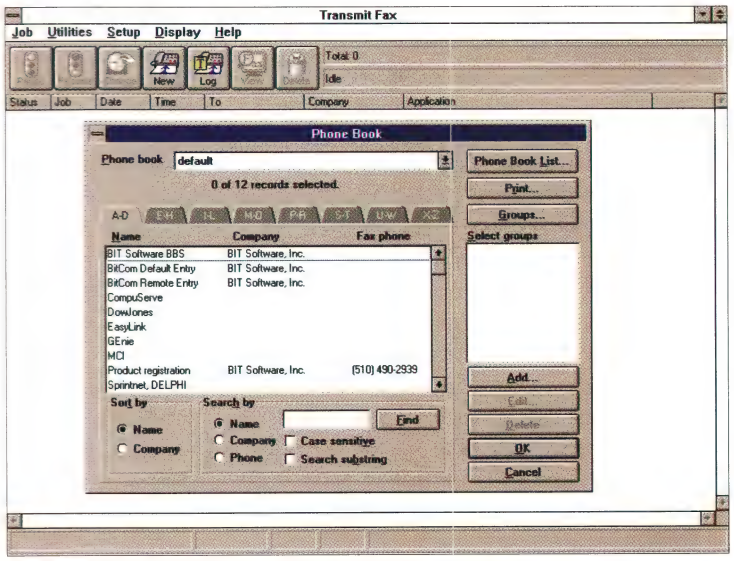
For more information about all products in this article, circle reader service no. 901.

BitFax Professional 3.0 for Windows

PROS: Includes data communications package, voice mail, fast and accurate OCR
CONS: Too many separate modules, slow to manipulate faxes

If you're looking for a package that can capably handle both fax and E-mail, put BitFax Professional on your short list: It comes with a full-fledged communications package, BitCom, built in. While BitCom doesn't measure up to the best stand-alone communications packages, the BitFax and BitCom portions of this package cooperate in their use of the communications ports, so you can use either program without first closing the other. BitFax Professional is also unique among the programs reviewed here in that it has a voice-mail program. If you have the appropriate modem, you can use BitFax's Voice Manager to set up and manage a voice-mail system.

If you want the best in a fax program, however, BitFax Professional for Windows isn't your wisest choice—it's neither the friendliest nor the most full-featured program available. True, BitFax Professional's fax-modem auto-detection makes installation easy, and the setup routine automatically generates a program group filled with icons. But while our testers found BitFax Professional generally easy to learn, they encountered a few hurdles along the way, such as the profusion of icons in the icon group and the complexities in some of the dialog boxes. You are faced with more than a dozen icons, including separate ones for accessing the send log, the receive log, Receive Manager (which prepares the system to receive fax calls), Fax Manager, and Print Fax. All the utilities are accessible through pull-down menu commands, but the system is initially confusing and not as convenient as having a centralized interface.



BETTER THAN A ROLODEX, BitFax Professional's phone book provides tabs for quick and easy scanning of names and numbers, and has flexible search tools.

BitFax Professional covers the basics well. It allows you to schedule faxes for later transmission, forward received faxes, annotate faxes, and create cover pages; and it supplies macros for sending from Word for Windows, Excel, and Ami Pro without changing the active printer driver. BitFax Professional comes with a phone book that's as easy to navigate as any we've seen, though our test users found the procedures for forwarding faxes and sending to groups

rather confusing. You can search or sort the phone book by name or company, and if you've got more entries than will fit on a page you may find the book's alphabetic tabs handy.

There are many features, however, that BitFax Professional lacks. For starters, it's slow at flipping and rotating faxes. The program doesn't offer an auto-delete function for zapping faxes off your hard disk after a set time period. While you can create your own cover pages, design capabilities are limited. And even though BitFax's OCR is the fastest and most accurate text recognition module of any of these packages, we had to download a software fix from Cheyenne Communications' BBS to get it to work. (The company says it is including the OCR fix in currently shipping programs.)

If you're looking for a reasonably priced package that combines voice-mail, fax, and data capabilities, give BitFax Professional some serious consideration. Ultimately, though, it falls short on features and ease of use, which together keep us from giving this product a Best Buy. *Cheyenne Communications, 800/243-9462, 516/484-5110*

Reader service no. 619

datafax+ 4.1

PROS: Capture utility, can receive in DOS, index and search tools, fax screening, usage statistics

CONS: Steep learning curve, no archive compression, can't create folders

Trio's datafax+ 4.1 has several features that make it stand out from the crowd. For example, the program neatly skirts one of the biggest inconveniences in PC faxing: having to switch printer drivers to send a fax. Datafax+ lets you draw a box around any text or image in any Windows application, and then use its Captive utility to generate a fax automatically, popping up the address book so you can choose recipients. You can also simply drag and drop files to fax from the File Manager onto the Captive icon, and even use the same method to merge two files into a single fax.

Datafax+ has lots of other useful and interesting tricks up its sleeve. You can screen out unwanted faxes by entering their originating phone numbers into the Reject Fax dialog box. Under the program's Statistics menu, you'll find charts that track transmissions

Real World Testing: Putting Fax Software on Trial

Developers are stuffing many more features into fax programs than most users will ever need or even know about. The top programs have more than enough muscle for most jobs, but are they easy to use?

We put the programs through their paces in the PC World Test Center's brand-new Usability Lab. We recruited a dozen users, each familiar with Windows and fax machines but unfamiliar with fax programs, to learn six Windows fax packages. We gave every tester a script with five tasks: Make a few entries in the software's phone book, fax a short letter, receive and view a fax, print it, and then forward it to two colleagues. While the tester followed the script, we recorded every action taken and we regularly prompted the tester for comments. At the end of each session, we held a debriefing interview with the tester.

While our test group was small, we were able to come up with some general observations about each program and about fax program usability in general.

WE'RE WATCHING YOU NOW: A tester tackles a fax program as the Usability Labs' Dean Andrews observes. Her screen display is shown on the large monitor at right.

GERRY GROPP

All the packages assumed too much Windows knowledge. We watched for hours as users struggled with tabbing between fields in phone list dialog boxes, and switching between apps to work in another program while receiving faxes. None of the vendors made general Windows information adequately accessible in their documentation.

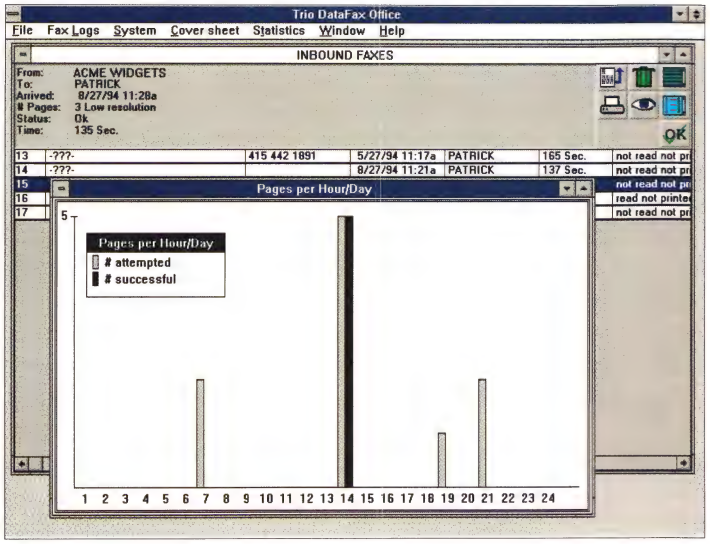
Learning to send a fax is difficult. Since you fax from a fax machine, then you must fax from a fax program, right? Wrong. The common method is to switch Windows' active printer driver to the fax-modem driver and then print from the application. It's no surprise nearly all our testers were baffled by this alien concept. Some packages let you insert a Fax Send command into specific apps' menus, but none of the testers could figure this out.

Almost every tester had problems working with cover sheets. Troubles ranged from not knowing which fields on a cover sheet were filled in automatically, to not knowing whether a cover sheet had been appended, to not being able to find cover sheets.

Guilty Verdict for the Vendors

Fax software has come a long way in usability, but it's not yet where it should be. Our jury of 12 deemed even the latest fax programs too hard to learn in the 2 hours we allotted. So if you find yourself staring numbly at your fax program's help screen, sit back and chant this mantra: "It's not me—it's the software." We know, because we tested it with real people under real conditions.

—Dean Andrews



DATAFAX+ OFFERS A HOST OF INTERESTING TOOLS not found in the other programs, including several useful statistical reports of fax activity.

according to a variety of criteria, such as the number of pages transmitted per hour and per day. If that's not enough, datafax+ comes bundled with an integrated version of Trio's Datasearch program, which automatically recognizes and indexes incoming faxes. Once that's done, you can use datafax+'s strong set of search tools to locate specific faxes. Datafax+ is also one of the few programs that offer NetBIOS network features, including a utility that allows the administrator to restrict specified users' access to datafax+ features, and one that enables you to forward a fax quickly to another user on the network.

Regrettably, datafax+ lacks a few basic tools. While you get an address book, logs for incoming and sent faxes, and a cover sheet editor—as well as the fastest on-screen fax rotation we've ever seen—datafax+ doesn't let you create new folders for storing faxes, nor does it let you archive faxes in compressed formats. Even more surprising, you can't print selected phone book entries. Furthermore, the bundled version of Datasearch supports only a few file formats, so you'll have to get the full version if you want to store documents in word processor formats. And while we found datafax+'s OCR accuracy to be among the best, it is still error prone, introducing uncertainty into Datasearch's system of automatic recognition and indexing.

Where datafax+ falls down most is in ease of learning and of use. Our testers found that it had the highest learning curve of the programs tested, mainly because its interface is relatively unintuitive and poorly organized. According to our testers, the vaunted Captive feature is daunting to learn, and they found many of datafax+'s icons too enigmatic. For example, the setup routine creates a program group that includes eight icons for accessing different program features—a fact the test users found confusing.

The bottom line is that you should buy datafax+ if you want its special capabilities, such as its Captive and Datasearch utilities, its statistical reports, and its fax-screening capability. Otherwise, you have fuller-featured and easier-to-use alternatives. *Trio Information Systems, 800/880-4400, 919/846-4990* **Reader service no. 620**

Eclipse Fax 1.21

PROS: Can receive in DOS, centralized interface, fast

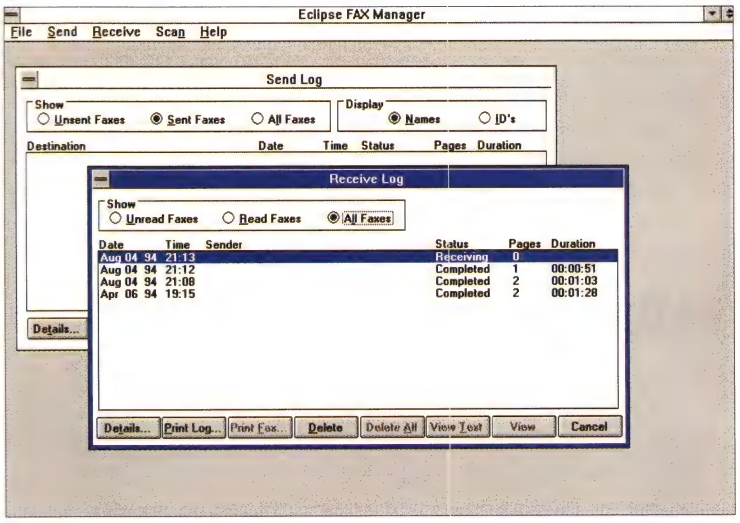
CONS: No modem auto-detect, can't sort phone book, poor OCR

Eclipse Fax has a number of strengths. The program comes with a DOS TSR that ensures reception even if you don't have Windows loaded when the fax arrives. It's also one of the quickest programs when it comes to rotating and displaying faxes. And while some users may be chagrined to find only a blank window with a narrow menu bar across the top, many will appreciate the program's single, centralized interface. You can quickly summon the send or receive logs just by selecting from the pull-down menus. Users of PackRat may find that Eclipse Fax is a particularly nice fit for them. Eclipse Fax can use this PIM's robust phone book for managing contacts and addressing faxes. In addition, PackRat users can log faxes into PackRat's database and search for fax events within PackRat.

Alas, this once highly rated fax program is overdue for an update. Eclipse Fax has not had a major revision since we put together a fax software roundup early last year, and it shows. For example, Eclipse Fax is the only program here that can't sniff out your brand of fax-modem during the installation routine—a hurdle for newcomers. Once you've got it installed, you'll discover a number of other drawbacks. Since the only macro provided is one for Word for Windows, chances are you'll spend a lot of time swapping printer drivers. Eclipse Fax also lacks an option to delete faxes automatically after sending or after a preset period of time.

Eclipse Fax also has drawbacks when it comes to received faxes. You can't create additional folders for storing faxes, and since Eclipse Fax doesn't provide tools for searching or sorting the receive log (other than by the categories read and unread), you can quickly lose track of your material. Our test users found Eclipse Fax particularly confusing when it came to putting the program into auto-receive mode. Finally, its OCR accuracy is noticeably lower than that of the competition.

You can't sort the program's phone book or even print phone book records. And Eclipse Fax offers only limited phone book search



KEEPING IT SUPER SIMPLE: Eclipse Fax's uncluttered interface gives you quick access to basic faxing tools.

Fax of the Future: Part of a Unified Communications Solution

As powerful as today's fax programs are, they are only one piece of the communications puzzle—and these pieces can be unruly. For example, just keeping your fax program, comm package, and remote E-mail software open simultaneously can be a problem, since all programs talk to the modem through the same COM port, and they're not good at sharing it. Unless you buy a port-sharing utility, like KingCom from OTC, that lets multiple programs share a single port, you could spend a lot of time opening and closing communications apps.

A big effort is under way in the industry to combine communications modes seamlessly. The BitFax Professional package, reviewed in this article, contains both fax and data components that can automatically hand off the COM port to each other. Other available bundles provide the same integration. Delrina's Communications Suite, for example, combines WinFax Pro and WinComm Pro. CommWorks from Traveling Software includes not only a fax program and a data communications program, but a remote-access utility and Traveling Software's LapLink Pro file transfer program. Some of the major data communications program vendors are also jumping in with integrated solutions, such as Mustang Software's Qmodem Pro 1.10 for Windows and the soon-to-be-released new version of Datastorm Technologies' Procomm Plus for Windows. In Qmodem, the fax utility shares the data communications program's phone book, but it lacks many of the basic tools of the stand-alone programs, such as the capability to schedule fax transmissions and to annotate and forward faxes. Several new communications packages, like the voice-enabled version of SofNet's FaxWorks, combine fax, data, and voice messaging.

All this frenetic bundling is merely a hint of things to come. We can look forward to integrated communications that do much more than just solve COM port contentions and provide unified phone books. In the not-so-distant future, expect programs to offer centralized, seamless access to all your computer communications, including modems, network E-mail, voice mail, and fax. You can already see glimmers of this in WinFax Pro 4.0, which can manage both your E-mail and your faxes in the program's logs. And though vendors have not committed to anything publicly, it's likely that at least some of the major E-mail programs will soon include faxing capabilities as an integrated part of their applications.

Wouldn't life be grand if to send a document or note all you had to do was click File • Send in your application and enter the name of the recipient? You wouldn't have to worry about specifying it as a fax, an E-mail, or another mode, because you would already have associated the communications type with the addressee in your unified phone book. Not only would you have a single phone book, but all your mail, in whatever form—fax, E-mail, even voice mail—would come to one mailbox.

capabilities that are not well documented. Specifically, you first enter a few characters in the name field, then press <Tab>, and the program takes you to the first matching phone book record. And as with many of the program's competitors, the process for creating phone book groups isn't clear-cut.

Eclipse Fax is a program sorely in need of renovation. Phoenix Technologies is promising a new version this fall, called Eclipse Fax 6.0, which the company says will include vastly enhanced fax management capabilities, as well as easier installation, more cover pages, and many other improvements. For the moment, however, you have other more powerful and easier-to-use choices. *Phoenix Technologies, 800/677-7300, 617/551-4000* **Reader service no. 621**

FaxWorks Pro 3.0

PROS: Easy to install and use, cue cards, auto-forward, fast
CONS: No sorting tools for logs

If you think FaxWorks Pro 3.0 looks a lot like Eclipse Fax, you're not imagining things; SofNet used an earlier version of the Phoenix program to develop its latest fax program. SofNet has been very aggressive in enhancing and updating FaxWorks Pro, especially when it comes to making the program more accessible to new users. In fact, FaxWorks Pro outshone the competition in our tests for ease of learning and of use—the main factor in our decision to award this program a Best Buy.

To begin with, FaxWorks Pro offers two installation routines: one for those familiar with modem configurations and communications settings, and one for those who don't know the difference between the COM port and the Port Authority. The first routine offers settings en masse for you to edit and approve, while the latter steps users through the process, explaining settings along the way. Fortunately, both methods feature automatic modem detection and configuration. The setup program also automatically checks your phone line to make sure you have a dial tone.

That's not all. Our test users found FaxWorks Pro's cue cards to be a big plus. Whenever the mouse pointer is over a menu selection, tool-bar button, or other significant screen element, a cue card pops up with a concise explanation of the feature. Once you've learned your way around the program, all those little yellow boxes can get irritating, so FaxWorks Pro lets you turn them off. If you need a refresher, you can still summon an item's cue card.

FaxWorks Pro is unique for its nifty FactsBack service. Click the FactsBack icon installed in the FaxWorks Pro program group, and you'll see a list of information files, such as technical support

Microsoft is heavily promoting this goal. In fact, if this software colossus has its way, you won't buy separate communications packages anymore, since their capabilities will come with the operating system. The idea is that you'll be able to access the fax utility, along with other communications utilities, from a menu command in any Windows app. Naturally, software developers have to build the extra menu item into their programs.

Windows for Workgroups 3.11 already includes a fax utility and a scaled-down version of Microsoft Mail. Plus you can send faxes and E-mail from a single phone book, and Microsoft Mail lists received faxes right along with your E-mail messages. The fax utility has some cool features, such as the capability to use a fax-modem attached to a different system on a Windows for Workgroups network, as well as binary transfer capabilities, encryption, and data compression. For the most part, however, this module is still bare-bones, lacking such basics as cover page designers, annotation tools, and text recognition.

The next version of the personal Windows operating system, code-named Chicago, which may be available by year-end, should have even more fully integrated communications. Expect this trend to strengthen in future versions of the various Microsoft operating systems.

For now, the best faxing programs are clearly the dedicated applications. However, users can look forward to highly capable integrated solutions.

WHERE TO BUY

KingCom, OTC Corp., $49.95; 800/769-6344, 714/832-4833
Reader service no. 632

CommWorks, Traveling Software, $200; 800/343-8080, 206/483-8088
Reader service no. 633

Qmodem Pro 1.10 for Windows, Mustang Software, $99; 800/999-9619, 805/873-2500
Reader service no. 634

reports, press releases, and other documents, available from SofNet. Once you've made your selections and clicked the Call button, FaxWorks Pro calls SofNet and retrieves the appropriate files. You can update the FactsBack file list to display any files added to the list since your last call.

Along with its special features for new users, FaxWorks Pro provides a strong set of fax tools, including a solid phone book utility, incoming and outgoing fax logs, fax scheduling capabilities, and fax annotation tools. You can set FaxWorks Pro to auto-delete faxes after a set time or after each send, and you can create additional folders for storing faxes. And though the phone book in FaxWorks Pro looks very much like that in Eclipse Fax, the former includes an extra button for printing its contents.

FaxWorks Pro equals Eclipse Fax in image manipulation and printing speed—which places it among the fastest available—as well as its integration with PackRat. Happily, FaxWorks Pro is noticeably more accurate in recognizing text. Finally, you get a slick auto-forward utility. If you know you're going to be away from your fax machine for an extended period, you can enter another fax destination and all incoming faxes are re-sent to it.

If you're looking for a powerhouse program, FaxWorks Pro isn't the strongest package you can find. For example, it lacks sorting tools for folders, a DOS TSR, and network features. But if you're working in Windows and want a very capable fax program that's a cinch to set up and use, FaxWorks Pro is clearly your best bet. *SofNet, 800/329-9675, 404/984-8088* **Reader service no. 622**

UltraFax 1.1

PROS: Low price

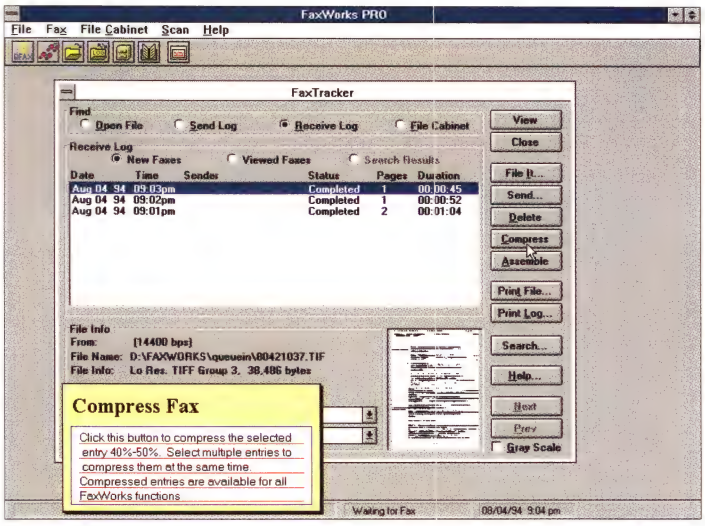
CONS: Hard to send faxes, no forwarding feature, no search tools, no archiving utility, poor OCR, no macro support

If—and only if—your faxing needs are basic and you're keeping a very close watch on your budget, you'll want to consider UltraFax. Its $49 list price makes it the least expensive Windows fax program available, and it's not without decent features. UltraFax makes it simple to schedule fax transmissions to individuals and to groups, and it has good viewing and annotating tools. You can also create custom folders for storing faxes.

But there's no free lunch. UltraFax has a very limited feature set, including a limited phone book and a lack of macros. The phone book lets you maintain lists of individuals and groups but does not provide any search or sorting tools, making it laborious to find a name in a large list of contacts.

UltraFax's fax management tools are sparse. You can't manually forward received faxes, much less set them up for auto-forwarding. Nor does UltraFax provide a feature for automatically deleting stored faxes. There are no search tools for fax folders, and of the programs we tested UltraFax took the longest by far to rotate faxes. Also, you can't compress and archive faxes. UltraFax has OCR, but its accuracy is miserable. Where most of the programs returned fewer than 20 errors in our test, UltraFax returned more than 40. Not many users are likely to bother with this feature.

Concerning ease of use, our testers picked up on some of the tasks right away, such as setting the program in auto-receive mode, adding records to the phone book, and creating groups of recipients. Unfortunately, they were also frequently stymied by UltraFax's unclear icons and dialog box fields.



EASIER THAN EVER: FaxWorks Pro's cue cards (lower left) pop up when the pointer's on a button. This Best Buy's the most approachable fax program yet.

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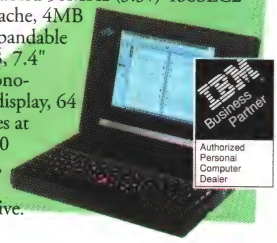

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11418 4/25c w/120MB Windows (wsl) ..... 2099.
11416 120MB (wsl) 2599. 11415 209MB (wsl) 2799.

IBM PC Company
4263 ValuePoint Si 4/25 w/120MB ..... 879.
4273 ValuePoint Si 4/33DX w/120MB ..... 1249.
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3904 ThinkPad 350 Mono w/250MB ..... 1799.
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13346 Ready 433ES w/ 210MB..... 1229.

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1620 WinDX 4/75C Active Matrix 340MB 4149.
1623 WinDX 4/75C Active Matrix 455MB 4999.

Toshiba Satellite Laptops
14354 T4700CS Passive Color w/200MB 3199.
14355 T4700CS Passive Color w/320MB.. 3449.
14347 T3400 Mono Subnotebook..... 1739.
14348 T3400CT Active Color Subnotebook 3419.

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15062 Studio Ser. Design Group CD-ROM 189.95

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2775 8 Port..... 249. 2772 12 Port..... 499.

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Data Storm PROCOMM PLUS
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5611 Crosstalk 2.0 for Windows..... 99.95

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14072 Communications Suite 114.95

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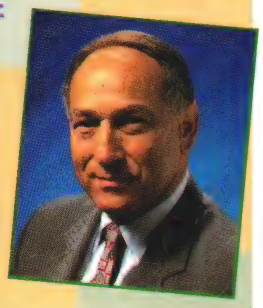

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Compaq Contura Aero

The **Contura Aero 4/25 Model 170** weighs just 3.5 pounds! 25MHz 486SX w/8K cache, 4MB RAM expandable to 12MB, 8" backlit VGA monochrome display, built-in trackball, 170MB Hard Drive.

15748 Contura Aero 4/25 Model 170..... **$1419.**
15747 Contura Aero 4/25 Model 84..... **999.**

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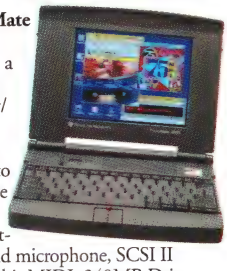
Texas Instruments

The **TravelMate 4000E WinDX 4/75C** gives you a blazing 75MHz 486DX w/coprocessor, 4MB RAM expandable to 20 MB, 9.5" TFT active matrix color display, 256 colors at 640 x 480 local bus, and 455MB or 340MB drive.

1623 4000E WinDX 4/75C Model 455 ..... **$4999.**
1620 4000E WinDX 4/75C Model 340 (8.4") ..... **4149.**

Texas Instruments



The **TravelMate 4000M DX4/75** has a fast 75MHz Intel DX4 w/ coprocessor, 4MB RAM expandable to 20MB, active matrix color display, built-in speaker and microphone, SCSI II interface, 16-bit MIDI, 340MB Drive.

10102 TravelMate 4000M DX4/75 Model 340 ..... **$4969.**

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14763 FaxModem VFP 28.8K (internal) $189.95
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2360 Norton Desktop Windows 115.95
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Canon Bubble Jet Printers ... 1 year
15187 BJ200E 299.95 9614 BJ-600 Color 589.95
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3295 Mouseman (combo)..... 45.95
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13360 ScanMaker IISP 749.95 13359 IIG 479.95
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1506 Smart Label Printer Pro..... 249.95
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13658 microLaser Pro 600 PS23..... 1399.
13659 microLaser Pro 600 PS65..... 1599.

UMAX ... 1 year
15897 VISTA $599.95
13514 ScanOFFICE for Windows..... 739.95
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13028 TextBridge (OCR)..... 65.95

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11851 105MB 3.5" Int. Removable IDE... 279.95
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NEC CD-ROM Drives... 2 years
13341 CDR-500 MultiSpin 3xi 499.95
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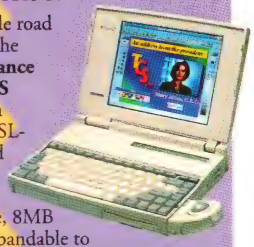
TEAC AT Drives ... 1 year
6951 1.2MB..... 55.95 7371 1.44MB..... 44.95

Toshiba T4700CS



Affordable road power! The **Performance T4700CS** features a 50MHz SL-enhanced 486DX2 (3.3v), 8K cache, 8MB RAM expandable to 24MB, 9.5" Dynamic-STN color LCD display, audio capabilities, 200MB Drive.

14354 Performance T4700CS ..... **$3199.**
14355 T4700CS (340MB)..... **3449.**

Apple Newton

The Apple **MessagePad 110** is the second generation of Newton PDA, with a sleek case, longer battery life, and more memory. Put your entire business in the palm of your hand!

1332 MessagePad 110..... **$599.**

ACCESSORIES/DISKS

American Power ... 2 years
3819 Back-UPS 250 109.95 3858 400... $169.95
Cyrix Microprocessor Upgrades
10538 486 DRX2 25/50 Micro. Upgrade ... 299.95
14035 SRX2 20/40 239.95 2563 DRX2 33/66 339.95
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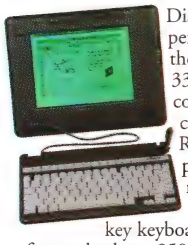
6199 Isobar 4-6.... 43. 6200 Isobar 6-6.... 49.

Compaq Concerto



Discover the ease of pen computing with the **Concerto 4/33**. 33MHz 486DX w/ coprocessor, 8K cache, 4MB of RAM, 9.5" passive matrix monochrome VGA display, 79-key keyboard with special-feature hotkeys, 250MB Drive.

13557 Concerto 4/33 M250..... **$1399.**
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13553 Concerto 4/25 M250..... **1319.**

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After Dark for DOS gives you more than 30 dazzling screen saver displays with digital sound and password protection. Enjoy the world-famous Flying Toasters, Aquatic Realm, Mowin' Man, and more!

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There are a lot of things you might want from a faxing program that UltraFax just can't deliver. So before you're tempted by the low price, make certain you aren't being penny-wise, pound-foolish. *SoftKey Int'l, 800/323-8088, 617/494-1200* **Reader service no. 623**

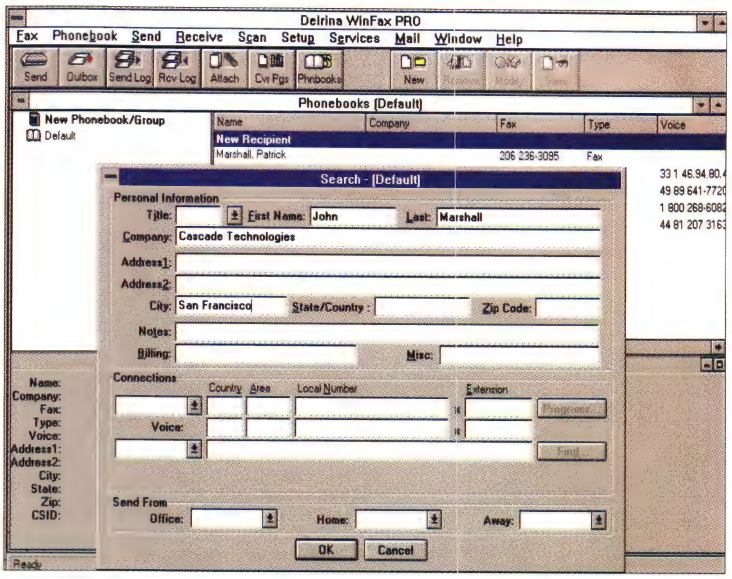
WinFax Pro 4.0

PROS: Strongest feature set available, remote access, E-mail integration, customizable interface

CONS: Complex interface requires learning time

Delrina's WinFax Pro has dominated the stand-alone fax program scene in recent years, and the release of version 4.0 secures its position for the next while. This program's sheer power easily rates WinFax the distinction of Best Buy.

Auto-forward, auto-print, auto-recognize—about the only thing WinFax can't do is read your received faxes out loud. And WinFax Pro has one of the most full-featured phone book utilities we've seen. Not only does its phone book have more room for data (including street addresses and phone numbers) than the competition's, it's by far the most searchable. It pops up an empty phone book form, and you can enter any string into any field and search for that string.

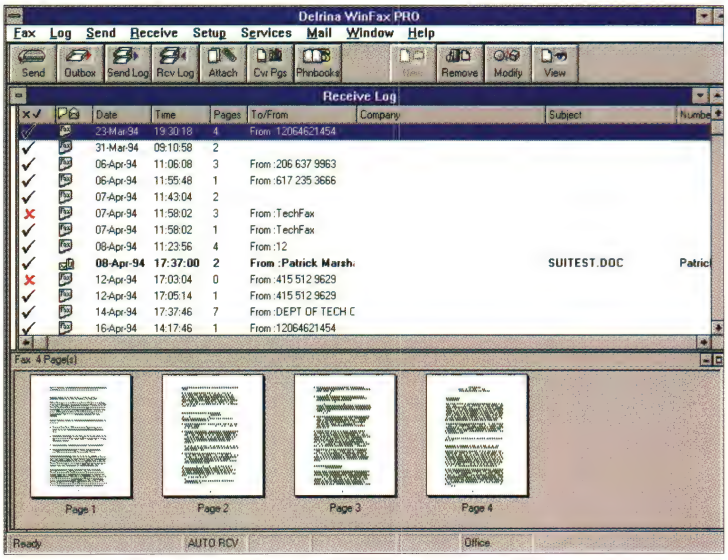


BEST BUY WINFAX PRO IS JAM-PACKED WITH GREAT FEATURES, including the best phone book search ability you can find in a fax program. You can search for records on any field or group of fields.

Current users of WinFax Pro will find version 4.0's most obvious change to be the program's interface. All the folders are now easily customizable: You can drag and drop columns to display fax information just where you want it, and you just click a column header to sort the folder according to the column's contents. You can configure the bottom panel of the folder to display any of three types of information for the currently highlighted fax—a text listing of file information, thumbnails of all the fax's pages, and a full-size image of the first page.

When it comes to designing cover sheets and annotating faxes, WinFax Pro has no peer. To begin with, you can select from among 110 sample cover sheets to use or customize. And no other program provides the strong controls WinFax offers for cover design, such as dragging screen elements to create layouts and inserting variable fields to merge time and date stamps or other data. Its many annotation tools make it easy to mark up faxes with any combination of text, boxes, drawings, and imported images. What's more, you can maintain the annotations in a separate layer if you like, rather than irretrievably merging the annotations into the fax itself.

WinFax Pro's list of unique and unusual features goes on and on. At the head of that list are the program's support for remote fax retrieval and its E-mail integration. The remote access feature lets you call your own WinFax-equipped system from another location (also using WinFax) and have it forward faxes to you. If you're using any of the major E-mail programs, you can manage your E-mail from WinFax folders, right along with your faxes. WinFax Pro's text recognition is at least as good as that of any other fax program, and WinFax Pro allows you to save recognized text in most major file formats, including Word for Windows, Ami Pro, WordPerfect, Excel, and 1-2-3 for Windows.



WINFAX PRO'S TWO-IN-ONE FAX AND E-MAIL INTERFACE is part of the trend toward integrating electronic communications methods. Here, an E-mail message (with the subject SUITEST.DOC) is listed along with received faxes.

As if the program's excellence were not enough, Delrina offers two new services for WinFax Pro users: mailboxes and fax broadcast. If you rent a mailbox from Delrina, you can have all your incoming faxes diverted to the mailbox while your system is off, for later pickup. The broadcast service allows users to send masses of faxes to Delrina for separate transmission from there, freeing your system for other business.

Our usability testing turned up a number of interface features that could be improved to make WinFax Pro easier to learn. For example, our users found adding names to the phone book a bit confusing. They also found it generally difficult to use the cover sheet designer. Clearly, beginners will have to set aside some extra time to learn this program. However, WinFax Pro is such a powerhouse and so flexible that it earns a Best Buy on those strengths alone. *Delrina Corp., 800/268-6082, 408/363-2345* **Reader service no. 624**

FEATURES COMPARISON

WinFax Pro: First in Features by Far

● Yes
○ No

	BitFax Professional 3.0 for Windows	datafax+ 4.1	Eclipse Fax 1.21	BEST BUY FaxWorks Pro 3.0	UltraFax 1.1	BEST BUY WinFax Pro 4.0
Standard features						
Price	$129[1]	$129[2]	$84.95[3]	$129	$49	$129
Automatic modem configuration	●	●	○	●	●	●
Send and receive faxes in DOS	○	●	●	○	○	○
Network version available	○	●	○	○	○	●
Send tools						
Drag-and-drop send from File Manager	●	●	○	○	○	●
Number of bundled send macros	1	2	1	1	0	4
Scan and send	●	○	●	●	●	●
Error control	○	○	○	○	○	●[4]
Attach binary files	○	○	○	○	●[5]	●[6]
Auto-delete fax after send	●	●	○	●	○	●
Receive tools						
Aural/visual notify reception options	●/●[7]	●/●	○/●	●/●	○/●	●/●
Auto-print on reception	●	●	●	●	●	●
Auto-OCR	●	●	●	○	○	●
Auto-forward	●	●	●	●	○[8]	●
Fax editing and management						
Insert graphics	●	●	●	●	●	●
Draw and text annotation tools	●	●	●	●	●	●
Annotation layers	○	○	○[9]	○[9]	○	●
Stamps	○	○	○	●[10]	○	●
Search tools	●	●	○[11]	●	○	●
Create folders to store faxes	●	○	○	●	●	●
Thumbnail view of faxes	●	●	●	●	●	●
Print log reports	●	●	●	●	●	●
Auto-delete faxes after set time	○	●	○	●	○	●
Archiving	●	○	●	●	○	●
Phone book						
Multiple phone books	●	●	●	●	●	●
Search capability	●	●	●	●	○	●
Import and export phone book entries	●	●	●	●	●	●
Create send groups	●	●	●	●	●	●
Field for address/voice phone number	○/○	●/●	○/●	●/●	○/●	●/●
Print selected entries	●	○	○	●	●	●
Sort entries	●	●	○	○	○	●
Credit card–number field	●	●	●	●	○	●
Cover pages						
Create cover page	●	●	●	●	●	●
Rearrange cover page layout elements	○	●	●[12]	●[12]	●	●
Insert variables	●	●	○	○	○	●
Add logo	●	●	●	●	●	●

[1] Version upgrade $49.
[2] Version and competitive upgrade $59.
[3] Version and competitive upgrade $29.95.
[4] Uses Error Control Mode (ECM).
[5] Can exchange binary files only with other systems using UltraFax.
[6] Needs to connect to a Binary File Transfer–compatible program and use a Class 1 or CAS modem.
[7] Can auto-enhance fax on reception.
[8] Lacks any forwarding capability.
[9] Preserves original unedited fax.
[10] Doesn't provide any but can create up to five stamps.
[11] Index feature lets you add comments, scroll indexed faxes, and sort by date and time and by alphabetical order.
[12] Can't rearrange existing elements but can add new ones.

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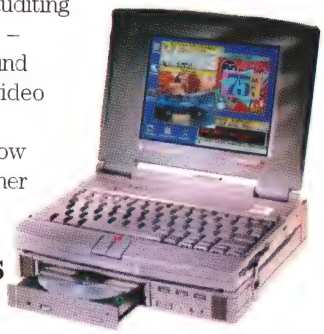

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IBM Credit Lease $78/month[1]	IBM Credit Lease $121/month[1]
• 486DX/33MHz[†]	• i486™DX4/100MHz
• Pentium chip upgradable[††]	• Pentium chip upgradable
• 270MB[2] HD, 4MB RAM	• 728MB[2] HD, 8MB RAM
• SpaceSaver with 3 slots, 3 bays	• Desktop with 5 slots, 5 bays
• VESA local bus	• VESA local bus
	• 256K L2 cache

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IBM Credit Lease $73/month[1]	IBM Credit Lease $110/month[1]
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• Pentium chip upgradable	• Pentium chip upgradable
• 270MB[2] HD 4MB RAM	• 364MB[2] HD, 8MB RAM
• SpaceSaver with 3 slots, 3 bays	• Mini-Tower with 8 slots, 6 bays
• VESA local bus	• VESA local bus
	• 128K L2 cache

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ValuePoint 433SX/Dp	ValuePoint 466DX2/Dp
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IBM Credit Lease $76/month[1]	IBM Credit Lease $97/month[1]
• i486SX/33MHz	• i486DX2/66MHz
• Pentium chip upgradable	• Pentium chip upgradable
• 270MB[2] HD, 4MB RAM	• 270MB[2] HD, 4MB RAM
• Desktop with 5 slots, 5 bays	• Desktop with 5 slots, 5 bays
• VESA local bus	• VESA local bus
	• 128K L2 cache

The ValuePoint configurations listed above include an IBM Enhanced 101-Key Keyboard & Mouse, 1MB Video Memory (upgradable to 2MB), DOS & Windows preloaded and a 14V monitor.

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• 170MB[2] HD, 4MB RAM	• 170MB[2] HD, 4MB RAM
• One Type III or two Type II PCMCIA slots	• One Type III or two Type II PCMCIA slots
• Over $800 worth of preloaded business software	• Over $800 worth of preloaded business software
• 1-year International Traveler's Warranty	• 3-year International Traveler's Warranty

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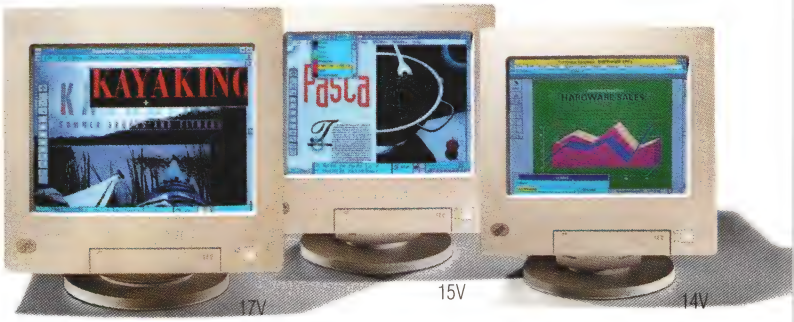
CustomerFit also covers what you see. And what you get.



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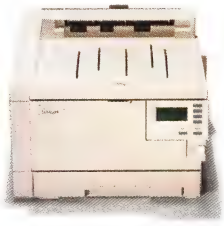

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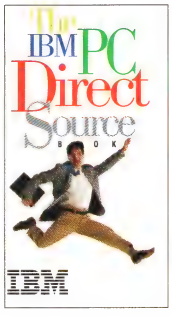

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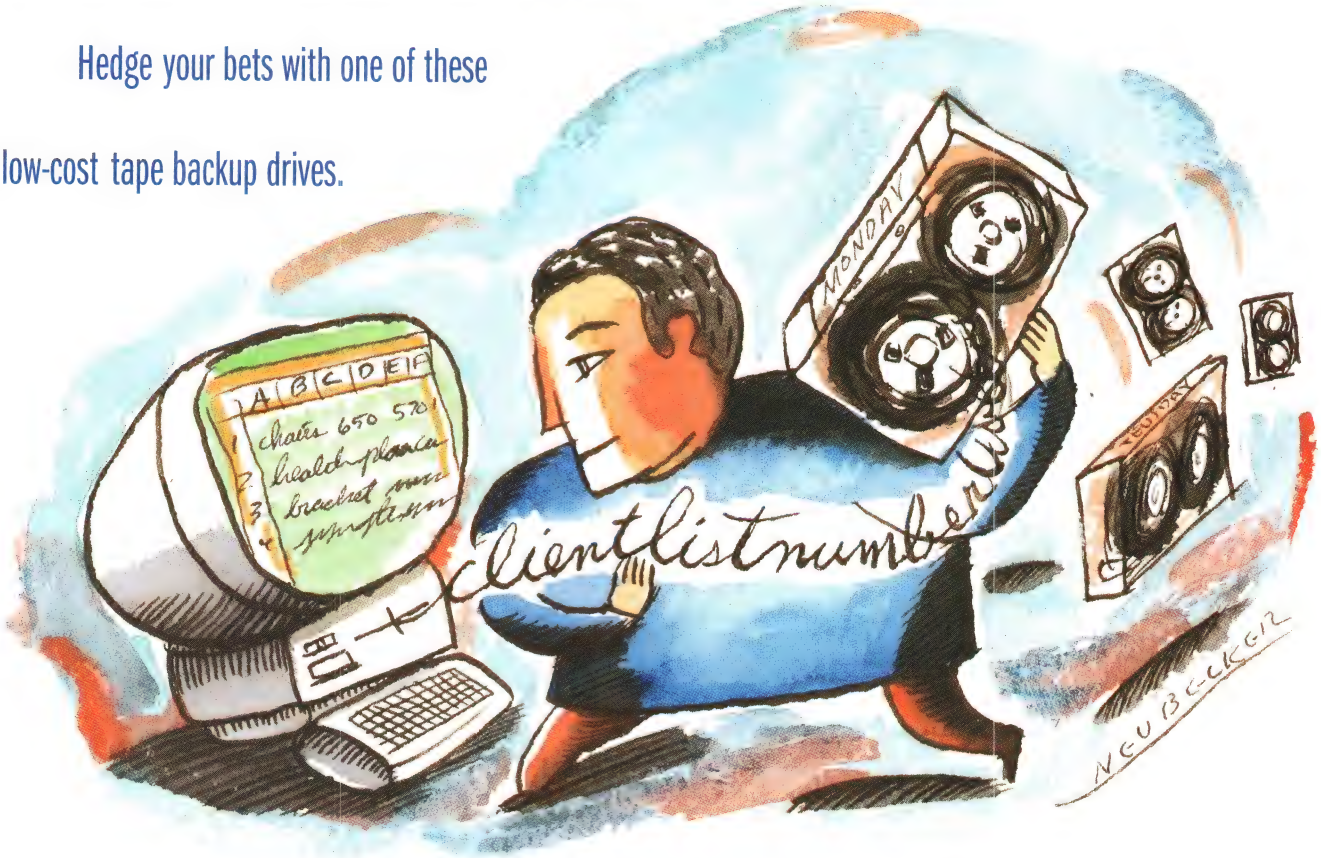
Back It Up!

Your files and data are too valuable to lose, so why risk them?

Hedge your bets with one of these 13 low-cost tape backup drives.



ROBERT NEUBECKER

BY REX FARRANCE, ANITA HAMILTON, AND SUSAN SILVIUS

Information and ideas are the lifeblood of any business. Most work is now accomplished via distributed computing, so data isn't likely to be stockpiled in hard-to-access paper files or sequestered on a mainframe. In fact, you probably have most of your business information stashed on PC hard disks. Whether your enterprise is large or small, you can't afford to lose a byte of data: No matter if it's a client list, a financial report, or a new business plan—if work or records get lost, your business is in big trouble.

While improved hard disk technology has almost obliterated the chances of drive failure, there's no lack of software glitches, and user error is an unavoidable fact of life. Single-click Windows software makes it easy to erase part or all of a document, only to discover that you can't undo the mistake. The best way to insure against data loss is to invest in a low-cost backup setup that's reliable and easy to use.

Affordability Drives the Backup Choice

While there are many types of backup units that will do the job, none is as economical as QIC (quarter-inch cartridge) drives using DC2000 tape minicartridges. Prices for all the products reviewed here include the drive, cabling, adapter (if required), and backup software. Some products even include a tape. If you shop around, you'll find that your initial investment in a popular QIC-80 format drive can be as little as $159 for an internal unit. Each 120MB tape cartridge costs a mere $20 to $35, depending on where you buy it,

and can typically hold 200MB to 250MB of compressed data. That means you can implement a sound backup strategy—rotating four cartridges—and wind up with a cost per megabyte of 50 cents (including the price of the drive). Factor in the increased capacity that compression provides, and the cost of backing up drops further. That adds up to cheap insurance, especially when balanced against the value of crucial files or the long hours you spent setting up your operating environment. As with all forms of removable media storage, the media costs much less than the drive; as you use more tapes, the cost per megabyte drops. Note that you can buy either unformatted or formatted tapes, with the latter costing about $5 more but saving you the half an hour to a couple of hours formatting takes.

Low cost isn't the only factor, of course. When balancing deadline demands against the need for data security, most users will put off backing up. Ultimately, convenience ensures backups get done regularly. Current backup programs allow prescheduled backups, letting you customize and automate the process for minimum interruption of your work flow. Choose the right capacity and type of drive, and you'll be able to do a full backup with a single tape. That means you can set it and forget it—leave your backup running when you're away from your desk, and return to find it complete.

The Backup Drive to Meet Your Needs

This review covers 13 complete tape drive packages, all of which include software. All but one of these products are QIC-80 drives, which use 120MB tapes. Vendors generally estimate capacity for compressed data at 250MB, but the true capacity depends on file compressibility. For example, text and some EXE files will compress much more, using a backup program's compression, than image files. ZIP and other precompressed files often won't shrink at all. As a rule of thumb, you can usually get about 200MB of business applications and files on a 120MB tape. Mountain's SideCar II allows you to format your tape with a proprietary scheme. This format eliminates QIC-80 compatibility but expands the maximum uncompressed capacity to 152MB; compressed capacity also increases accordingly. Conner's QIC-80 TapeStor drives offer read-compatibility with Irwin AccuTrak format cartridges; Iomega drives promise limited AccuTrak read-compatibility.

QIC-80 drives are still the standard for backing up personal workstations. These drives have the capacity to back up typical business PCs, most of which have less than 200MB of data on their hard disk. You can execute full backups with a single tape, for maximum convenience. And at just $159 to $250, internal models are dirt cheap. All these features combine nicely to make internal QIC-80 drives the right fit for most budget desktop PC buyers.

Internal models are generally the better choice if your PC has an externally accessible drive bay available. They're less costly than their external siblings, saving you $100 or more. All eight internal units in this review are 3½-inch drives, but if your computer's sole free bay will accommodate only a 1-inch-high unit, you'll have to choose either the Conner TapeStor 250, the IBM DualStor 250, the Best Buy Iomega Tape250 Internal Plus, or the Memorex Tape Drive Backup System. IBM's drive is manufactured by Conner, while Iomega makes the Memorex unit.

If you lack a free drive bay or need to back up more than one computer with the same unit, you'll want an external model. The costliest external drives are parallel port units, which plug into printer ports, making it easy to switch them from machine to machine. These QIC-80 drives cost more—from $325 to $385—and their backup speed can't match that of the fastest internal units. But their convenience and versatility make the difference for many budget and power users.

Because of a mix-up in ordering, we were unable to include Conner's TapeStor 250 Parallel Port Tape Backup System. The drive sells on the street for $300 or less, and it offers an integrated power supply that automatically adjusts to international power requirements. Like the Conner internal model, this drive will come with Conner Backup Exec software by the time you read this. We regret the omission of this product, as it's priced below the other parallel port drives here and is competitive in all other areas.

Best Buys

It was a dogfight for the top spots in this review. The Iomega Tape250 Internal Plus emerged from the melee as the top internal tape backup unit, combining a good price with fine performance and a tiebreaking five-year warranty. The same vendor's Tape250 Parallel Port was the winner for external portable models.

New Choices for Power Users

Typical desktop hard disks are now 300MB and more, while high-power desktop systems are sporting drives of over 500MB. As a result, tape manufacturers are spawning the next generation of affordable tape drives that allow single-tape full backup convenience, even if you store more than 200MB of data on your hard disk. These QIC-3010 drives, like QIC-80 units, can use the floppy drive controller, but QIC-3010 drives can use both 255MB and 345MB tapes, with capacity for approximately 500MB and 700MB of compressed data, respectively. For more information about these

exciting new units plus an even higher-capacity SCSI tape drive, see "Affordable Tape Drives More Than Double Capacities."

If you perform engineering, design, or publishing tasks, you need a jumbo hard disk that stores a ton of data. In that case, a QIC-80 drive will demand multiple tapes to complete a full backup. Buyers of loaded power desktop systems will typically prefer a higher-capacity backup setup. Fortunately, cost-effective SCSI minicartridge drives are available. We were able to review just one SCSI drive here: the Exabyte FS1G, which is capable of storing 750MB of uncompressed files per 350-MC cartridge. (We were unable to review the drive from Teac, another SCSI DC2000 manufacturer.) By the time you read this, Exabyte says, its product will be available with a 1GB tape, and Conner promises delivery of its TapeStor 4000 SCSI drive with an uncompressed capacity of up to 2GB before September. You can use compression with these products, too, and their capacities increase accordingly. Exabyte's SCSI unit is street priced at $715 with an adapter. That's not cheap, but if your hard disk holds 700MB or more of programs and data, the price isn't unreasonable. And the 750MB 350-MC media is priced in the same range as 120MB QIC-80 tapes. When you factor in the media's capacity, the cost per megabyte actually falls below that of QIC-80 units.

The Ups and Downs of Installation

Unless you buy your backup drive integrated in a new system, you'll have to install it. The parallel port models are the easiest to install. You just plug them into the parallel port and a power outlet, run their software utilities, and start backing up.

While installing an internal drive is generally painless, you may run into a few problems. We had some trouble with the Colorado Jumbo 250—not with the hardware installation but in debugging a glitch that caused the drive to take several hours to complete our incremental backup test. We had never run into this problem before when installing a Colorado drive. After a few calls to the company's helpful support technicians, we found the difficulty: We had to reset our DX2-66's I/O bus clock speed value higher in system setup to accommodate the tape drive. All the subsequent tests went without a hitch.

The Exabyte FS1G SCSI tape drive is bundled with a host adapter. Configuring a SCSI adapter isn't always easy—particularly if your PC already has a SCSI device installed. Fortunately, the Exabyte's installation went fairly smoothly, despite our test system's SCSI hard drive—although it did require some technical know-how. The installation of the other products went without incident.

Backup Packages With a Little Bit More

If you like one of the tape drives in this review—but not its backup program—or you're dissatisfied with your own drive's software, consider a retail Windows program. These packages usually have more features than the bundled products and sell from $55 to $110. If you own the current PC Tools for Windows or Norton Backup for Windows, you already have one of the best backup programs available.

The backup software field got smaller last fall when Symantec acquired Fifth Generation Systems and Fastback Plus—one of the leading DOS packages. Symantec continues to market Fastback Plus for DOS but has discontinued its Windows version along with the DOS version of Symantec's Norton Backup.

Norton Backup and the backup utility in Central Point's PC Tools for Windows are the two top sellers in the Windows arena. Earlier versions of both earned Best Buys in our last backup software review. Both are fast, full-featured programs that support high-speed floppy controllers. In April Symantec announced yet another merger—with Central Point Software. Symantec says in most cases, products are complementary and will continue as separate brands. Where there's too much overlap, merged products will be developed, but any major change will take at least a year.

Norton Backup 3.0 for Windows has a reputation for ease of use, and it has three user levels. It supports most QIC-40/80 and SCSI drives, and it costs about $90. Norton Desktop for Windows—under $120 at discount—combines Norton Backup, a Windows desktop, and a collection of data recovery utilities. *Symantec Corp., 800/441-7234, 503/334-6054* Reader service no. 628

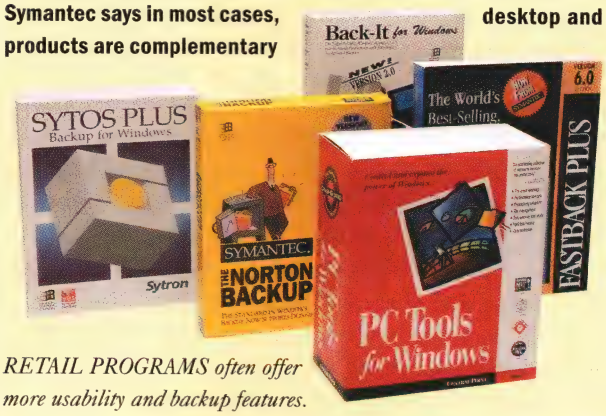
You can buy Central Point Backup for Windows as a stand-alone, but PC Tools 2.0 for Windows includes it with a Windows desktop and productivity and data recovery utilities. This $90 program lets you integrate virus checks. *Central Point Software, 800/964-6896, 503/690-8088* Reader service no. 629

Cost-conscious buyers may want a look at Gazelle's Back-It 2.0 for Windows. This $50 package is the only program aside from Central Point Backup that checks for viruses. *Gazelle, 800/786-3278, 801/377-1288* Reader service no. 630

Sytron's $110 Sytos Plus 2.0 for Windows should be out by the time you read this. This upgrade allows recovery from damaged media and supports NetWare 4.01. In addition, it allows you to set a priority level for background backups, enabling you to decrease backup speed and minimize the performance hit on foreground apps, or vice versa. *Sytron Corp., 800/877-0016, 508/898-0100* Reader service no. 631

If one of these stand-alone packages strikes your fancy, it will almost assuredly work with your internal drive—so far, however, none of these packages supports parallel port drives.

—A. H. and S. S.



RETAIL PROGRAMS often offer more usability and backup features.

Up and Running

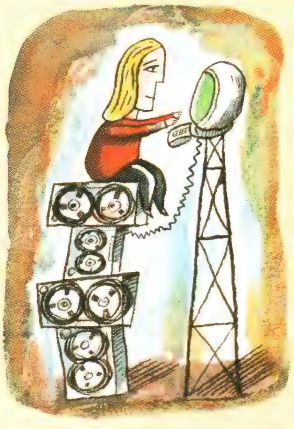
Since the software bundled with the drive is your steering wheel, it's essential that the program be easy to use, provide the features you need, and be well documented. All the drives reviewed here—except for Mountain's FileSafe TD-250—come with both DOS and Windows packages. When possible, we tested with the Windows software in order to reflect our readers' preferences.

The capability to preschedule is a critical adjunct to making sure backups get done regularly. All but Colorado's Backup for Windows Lite 1.2 and Backup 4.03 for DOS come with a scheduler and the capability to automate procedures. Unfortunately, using the schedulers can be a bit tricky for the novice, usually because of unclear on-screen instructions. Unless you're an experienced user, you'll often have to search online help or the manual for assistance.

Central Point's scheduler (bundled with Wangtek's drive) provides the clearest instructions and easiest implementation, allowing you to choose your backup type from a list of previously saved backup types. Mountain's FileSafe V5.2.8-TD for DOS (bundled with the FileSafe TD-250 and the FileSafe SideCar II), along with some of the otherwise quite good Windows programs from Iomega, MicroSolutions, and Tecmar, requires command-line entries when scheduling. IBM's, Iomega's, MicroSolutions', and Tecmar's software requires you to find a selection buried in the file menu to save settings. Mountain provides a nice touch in its FileSafe for Windows (bundled only with the FileSafe SideCar II): a convenient button that lets you save procedures and create Program Manager icons for them. Memorex's Norton Backup lets you create macros to save backup sets.

All the software programs allow you to choose from a variety of backup and restore options. You can back up your entire hard disk,

Ten Top Tips Make Backing Up Easier and Safer



1 Give tapes a useful retirement. Tapes don't last forever, so rotate in new cartridges about once a year. But don't ignore the old tapes' usefulness: Store them with a current backup of your hard disk. Or free up disk space by archiving applications, data, or image files you're not using.

2 Develop a realistic backup strategy. That new tape drive needs a sound plan to give you optimum protection. Assuming one tape will back up your whole hard drive, start with four tapes (adjust the number appropriately if backups require multiple cartridges). Use the first for a full backup and store it safely, preferably off-site. Use the second to store a week's worth of daily modified-files backups. On Friday append a full backup and store the tape. Then rotate in the third and fourth tape, one per week. When all your tapes are full, erase and rotate the first tape back in, following the strategy described for the second tape. You can never lose more than a day's work, and you'll always have a complete backup for each of the last three weeks.

3 Put backups on autopilot. Use your backup scheduler: You'll never have to think about backing up again. Just rotate your tapes once a week.

4 Run short backups in the background. Windows users should run short backups of files—such as those modified since the last backup—in the background. You can continue working with other applications in the foreground while your backup runs behind the scenes. Because the speed of both the backup and the foreground apps is degraded, however, the longer the backup, the more you should consider running it at lunch time or after hours.

5 Create your own backup sets. All but the most rudimentary backup programs let you create, modify, and save your own backup sets to execute functions automatically—saving you keystrokes and mouse clicks. For example, you can set up an automatic routine that sequentially scans your hard drive and removable media drive for modified files and backs them up, appending each set to your minicartridge.

6 Backups save time on reinstallations. Windows users know corrupted apps are always possible. Deleting a corrupted app is simple, but reinstalling is a time-consuming, disk-swapping pain—unless you have a full backup from before the corruption occurred.

7 Back up all your applications too. Floppy backup users often back up just their data—figuring that in the event of a disaster, they can always reinstall their programs from the original floppies. Don't let that habit carry over to tape backups. It takes far too long to set up and tune your environment and applications to your working style. Tape gives you the space to protect your complete environment.

8 Turn off your screen saver for faster Windows backups. Don't let your Windows screen saver run during a full backup. It will force your backup to run in the background and slow it dramatically. That means the 30-minute backup you planned to run during a 45-minute meeting could actually take an hour or more.

9 Compression won't cramp your style. Don't be wary of letting your backup program compress data on backup tapes: Backup compression is safe and substantially expands tape capacity. With today's fast business PCs, compression has little effect on backup speeds.

10 Keep full backups current on your home PC. It's hard to auto-schedule full backups on your home PC, where you may work at irregular times. So run a quick modified-files backup after every work session. If you ever have to do a full restore, however, you'll find it a pain to restore an out-of-date full backup and then have to sequentially bring back a slew of modified-files backups. So make sure you do a full backup once a month and after every major software change. —R. F.

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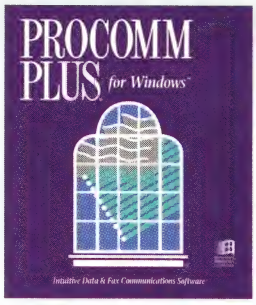

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Affordable Tape Drives More Than Double Capacities

By the time you load a 300MB-plus hard drive with applications and files, a QIC-80 tape drive's 200MB to 250MB capacity for compressed data feels tighter than a new pair of shoes. The capability to back up an entire hard disk on one tape is a prime requirement for users who want to let backups run unattended. Now tape drive manufacturers are moving to meet the capacity challenge.

At least some of the next generation of affordable QIC-3010 drives should be on sale this summer. We got a look at prototypes from Colorado, Conner, and Iomega. Although none of them were ready for formal testing, it seems likely that these drives will perform on par with QIC-80 units, as both drive types have identical data transfer rates. Drives will ship with the same software and warranties as their reviewed QIC-80 siblings. The internal units fit 3½-inch-wide bays, but only Conner's and Iomega's fit 1-inch-high bays.

Like QIC-80 drives, QIC-3010 units can use the floppy interface, and they will all be able to read your QIC-40/80 tapes. But QIC-3010 cartridges will hold 255MB and 345MB of uncompressed files on standard and extended-length tapes. With the latter, you'll typically be able to store about 550MB to 700MB of compressed files and data. That more than hits the sweet spot for hard disks found in typical budget desktop PCs, with reserve capacity left to handle the 500MB-plus hard drives in power systems. With list prices projected at $399 to $499 for internal units, expect QIC-3010 drives to become the prime choice for users with 250MB to 600MB of data to back up.

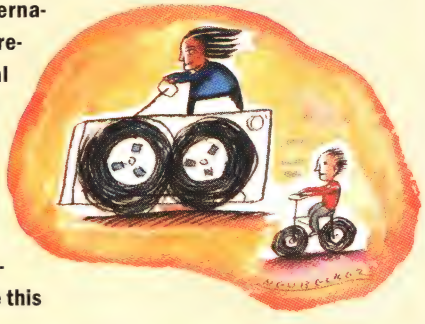
Colorado, manufacturer of the best-selling Jumbo 250 QIC-80 drive, will provide its Jumbo 700 QIC-3010 drive for those ready to graduate to a larger capacity. The drive will appear initially as an internal unit listing at $499; a parallel port version is also planned.

According to the manufacturer, Conner TapeStor 700 internal and parallel port models will be able to read Irwin AccuTrak 120/250 tapes as well as QIC-40/80 media. These drives also have the capability to use the QIC-Wide media developed by Sony, which provides a wider tape inside a standard-size case. Conner says the compressed capacity with QIC-Wide media will be about 900MB. The parallel model offers an integrated power supply and can adjust to international power requirements. The internal and parallel port models will list for $499 and $599, respectively.

Conner will also introduce a SCSI QIC-3080 tape drive late this summer. It will use both the 1.6GB minicartridge and the new 2GB QIC-Wide minicartridge. Conner estimates capacities for compressed files at 3.2GB and 4GB, respectively. The drive will have a 512K buffer and is rated capable of backing up at up to 54MB per minute. The drive is compatible with Conner SCSI DC6000 and DAT adapters and software and will list for just $650. We'll provide a more detailed, hands-on look in an upcoming issue.

Iomega says its QIC-3010 offering, the Iomega Tape510, will read AccuTrak tapes written with Irwin EZTape backup software 2.02 through 3.2. As with Conner's drive, we didn't test AccuTrak compatibility. The internal unit will list for just $399; the Tape510 parallel port model for $599. The five-year warranty rates special mention.

—R. F.



individual files and directories, or recently modified files. Most of the products enable you to search by selecting a date range or by using a DOS wild card. All of them let you select files from a tree directory that has file attributes displayed as they are in Windows File Manager.

While most programs estimate the time it will take to back up, the feature is of limited use, as the estimates all tend to be inaccurate. Keep in mind that the bundled utilities aren't your only software choice; you may already own an even better backup program (see "Backup Packages With a Little Bit More").

The Easiest Isn't Always the Best

Colorado's Backup for Windows Lite, bundled with both of the Colorado drives reviewed, excels in ease of use and is ideal for novices who don't want to have to fuss with a bunch of settings. Half of every screen consists of icons, pictures, and written instructions that explain how to select files, back up, restore, and access the tape utilities. However, the package lacks some useful features, such as a scheduler. In addition, it limits your options when restoring. You have to choose between always overwriting an existing file or never overwriting; you can't set the program to prompt you before overwriting a newer file. Fortunately, Colorado does offer a more robust Windows version, but it costs an extra $45 or so.

Similarly, we found Conner's Backup Basics Windows decent, although it didn't offer the full features of some packages and was a bit confusing. Conner agrees with our assessment and plans to be bundling its more full-featured Backup Exec for DOS and Windows with its drives by the time this review appears. Conner is a majority owner of Arcada Software, programmers of Symantec's popular Norton Backup products. Backup Exec is also an Arcada package, although it differs from Norton Backup in features and implementation.

The Windows packages bundled with the IBM, Memorex, and Wangtek drives provide two or three user levels, which will allow you to grow into using the more advanced features. Iomega's, MicroSolutions', and Tecmar's backup software impressed us with intuitive integration of advanced features. These packages give you clear, step-by-step instructions for backing up, restoring, comparing data, and customizing procedures. Although the three packages all bear different names, they're written by Arcada and their interfaces and manuals are virtually identi-

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cal. If you want to customize a feature, you can click on it and see the selections for speed, compression level, options to overwrite the tape, or append.

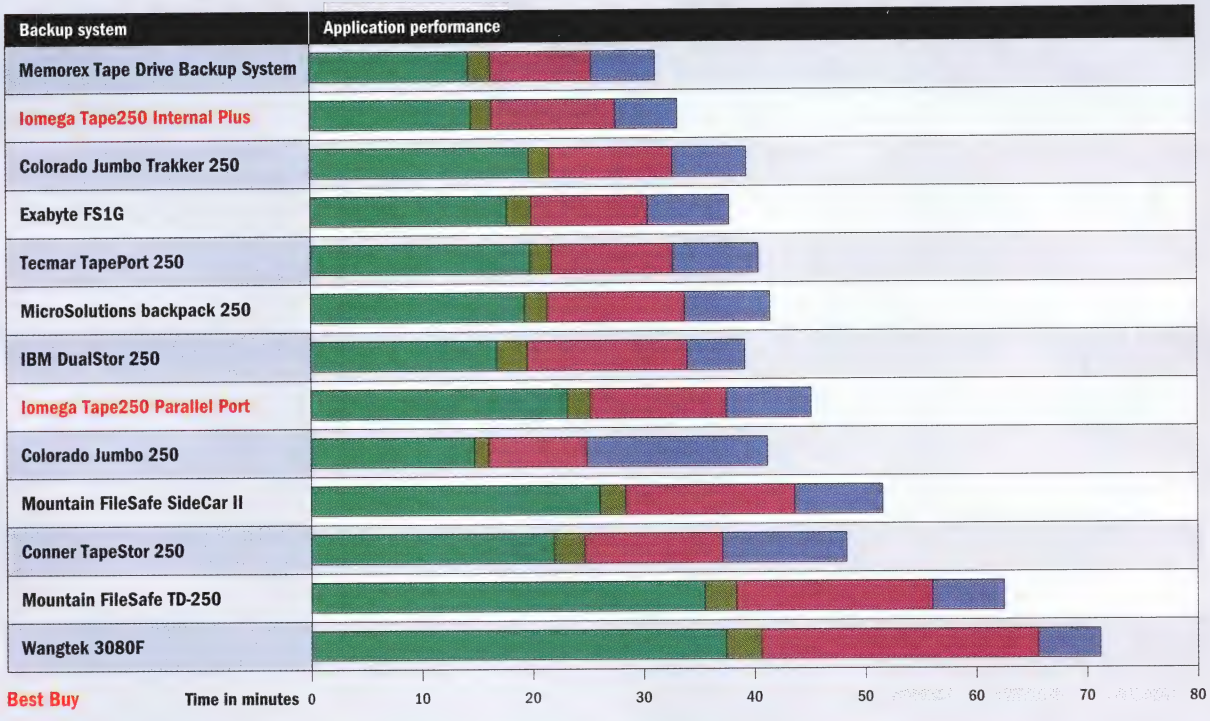
While Memorex's version of Norton Backup bears distinct similarities to the aforementioned packages, it lacks the step-by-step instructions. Furthermore, the scheduler isn't integrated with the backup application, and you have to go to the help menu to find backup operation descriptions. These deficiencies in Memorex's software keep this otherwise fine, fast backup solution from joining Iomega's internal and external models as a Best Buy.

Mountain's FileSafe for Windows and Wangtek's Central Point Backup are slightly less successful at integrating basic and high-end functions, making it harder for inexperienced users to figure out which button to press, and when. Still, their feature sets are adequate. Windows users will be disappointed to learn that the Mountain TD-250 comes with just a DOS package. Mountain does have an optional Windows package that sells for about $79. Exabyte bundled FileSecure for Windows software with our drive, but it plans to switch to another Windows program by the time you read this.

Some packages have unique features. For example, Wangtek's Central Point Backup is the only product here that performs virus checks before backing up. And Mountain's FileSafe for Windows includes a rescue feature that lets you restore a full backup of your hard drive without having to reinstall your operating system.

PC WORLD TEST CENTER REPORT

Memorex and Iomega Drives Yield Fastest Backup Times



Tape drives are arranged in order of overall performance from best to worst, based on the total of the scores from four equally weighted tests. However, slower performance by a drive in one test may cause its overall bar to be longer than that of a drive with worse overall performance.

Methodology
We tested all tape drives using a Polywell 486DX2-66 with 8MB of RAM, an Adaptec AHA-2480VL/2842VL SCSI host adapter, and a 2GB Seagate ST12400N SCSI hard drive. The hard drive was divided into three partitions, each containing directories, programs, and data files. We sized 175MB and 750MB partitions containing 138MB and 550MB of data, respectively. We ran DOS 6.21, Windows 3.1, and the backup software from the remaining partition. We used the floppy drive controller on the test system's SCSI adapter, except with the SCSI product, for which we used the SCSI adapter provided by the vendor. Using the software bundled with each tape drive, we executed backups using the highest level of data compression, without enabling verification. When given both Windows and DOS versions of the bundled software, we selected the Windows application, running each backup as the primary task with no other applications running in the background.

Full backup
On all the tape drives, we ran a full backup using the 138MB of files and directories in the 175MB partition. With the Exabyte SCSI model, we also ran a 550MB full backup using the 750MB partition. The 550MB backup took 63 minutes and 22 seconds. Each full backup was done using an empty formatted tape.

Incremental backup
Incremental backups select files that have been changed since the last full or incremental backup and then reset the archive bit to indicate that they've been backed up. We backed up 159 files containing approximately 3MB per day for ten days and averaged the numbers. For the Conner Backup application, we had to manually reset the archive bit to simulate an incremental backup.

Differential backup
Differential backups select the files changed since the last full backup. Using the 175MB partition on the hard drive, we did four differential backups of 6MB, 13MB, 18MB, and 24MB. The differential backups were added to the incremental backup tape at the end of 5-, 10-, 15-, and 20-day intervals, respectively.

Restore
We erased the Windows subdirectory on the 175MB partition, then restored it using the fastest method the backup software provided.

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The Fastest Backups

What about backup performance? It's easy to argue that as long as your whole backup fits on a single tape, speed doesn't matter. After all, you can always leave your backup to run overnight. But suppose you want to run a full backup on your lunch hour. And if you preschedule backups of modified files during work hours, you want them done quickly so you have minimum interruption of your work flow. We tested performance by executing four typical backup functions (see the PC World Test Center Report).

Except for tape formatting, full backups tend to take more time than any other task. All of the drives in this review completed a full backup of 138MB of directories and data files in well under an hour. The Memorex, Iomega, and Colorado internal drives were fastest of all, completing the task in less than 15 minutes total. Parallel port models tend to be a bit slower, but Colorado's Jumbo Trakker 250 and Tecmar's TapePort 250 impressed us by completing a full backup that took only about 20 minutes. The Wangtek 3080F internal model posted the slowest time here, although it still finished the

FEATURES COMPARISON

Minicartridge Tape Drive Capacities Fit Budget and Power Users

● Yes
○ No
n/a = not applicable

	Colorado Jumbo 250	Colorado Jumbo Trakker 250	Conner TapeStor 250	Exabyte FS1G	IBM DualStor 250	BEST BUY Iomega Tape250 Internal Plus	BEST BUY Iomega Tape250 Parallel Port	Memorex Tape Drive Backup System
Standard features								
Unit type	internal	external	internal	internal	internal	internal	external	internal
Vendor-estimated street price	$159	$350	$159	$715	$225	$189	$325	$179
Capacity and formatting								
Formatted capacity (MB)	120	120	120	750	120	120	120	120
Vendor-estimate compressed capacity (MB)	250	250	250	1500	250	250	250	250
Tape cartridge included	○	○	○	●	●	○	○	○
Tape cartridge price	$23	$23	$20	$25	n/a[2]	3 for $65	3 for $65	$21
Interface	floppy controller	parallel port	floppy controller	SCSI adapter	floppy controller	floppy controller	parallel port	floppy controller
3½-inch drive	●	n/a	●	●	●	●	n/a	●
Fits 1-inch-high drive bays	○	n/a	●	○	●	●	n/a	●
Mean time between failures (thousands of powered-on hours)/duty cycle	40/6%	40/6%	100/20%	80/10%	65/5%	30/100%	30/100%	30/100%
Bundled software								
DOS software	Colorado Backup 4.03 for DOS	Colorado Backup 4.03 for DOS	Conner Backup Basics 1.3 DOS	FileSecure 2.0 for DOS	DualStor 1.0 DOS	Iomega Backup 3.0 for DOS	Iomega Backup 3.0 for DOS	Norton Backup for Memorex 1.0 DOS
Windows software	Colorado Backup for Windows Lite 1.2	Colorado Backup for Windows Lite 1.2	Conner Backup Basics 1.3 Windows	FileSecure 2.0 for Windows	DualStor 1.0 Windows	Iomega Backup 3.0 for Windows	Iomega Backup 3.0 for Windows	Norton Backup for Memorex 1.0 Windows
Warns before overwriting backup set	●	●	○	●	●	●	●	●
Warns before restoring over newer file	○	○	●	●	●	●	●	●
Restores files to different drive or directory	●	●	○	●	●	●	●	●
Quick erase	●	●	●	○	●	●	●	●
Scheduler	○	○	●	●	●	●	●	●
Service and support								
Warranty (years)	1	1	2	2	2	5	5	2
Toll-free support	○	○	●	●	●	○	○	●
Daily support (hours)	9	9	10	24	24	8	8	11/8[3]
Weekend support	○	○	○	●	●	○	○	○
Service center turnaround (days)	1	1	1	2	1	5[4]	5[4]	1[5]
Contact	800/845-7905, 303/669-6500	800/845-7905, 303/669-6500	800/626-6637, 714/641-1230	800/392-2983, 303/442-4333	800/426-2968, 914/766-1900	800/777-6654, 801/778-1000	800/777-6654, 801/778-1000	800/225-5679, 408/957-1000
Reader service number	637	638	639	640		642	643	644

[1] Mountain rates its alternative format at 152MB uncompressed and 305MB compressed.
[2] IBM does not sell tape cartridges.
[3] 11 hours weekdays except Fridays; 8 hours Fridays.
[4] 24-hour replacement $35.
[5] All malfunctioning drives replaced within one day at no charge.

backup in under 40 minutes. If you have software that supports 1-megabit-per-second (mbps) transfers, installing a high-speed tape controller card should speed up your backups. This type of card will also help if your system BIOS supports only two floppy devices and you already have two floppy drives. Most tape drive vendors sell a high-performance controller, but the prices on these cards tend to run in excess of $100. GSI (800/486-7800) makes a card that supports IDE devices, floppy drives, and the faster tape transfers and sells for about $60 on the street.

	MicroSolutions backpack 250	Mountain FileSafe SideCar II	Mountain FileSafe TD-250	Tecmar TapePort 250	Wangtek 3080F
	external	external	internal	external	internal
	$339	$385	$179	$350	$250
	120	120[1]	120	120	120
	250	250[1]	250	250	250
	○	○	○	○	○
	$28	2 for $40	2 for $40	5 for $145	$20
	parallel port	parallel port	floppy controller	parallel port	floppy controller
	n/a	n/a	●	n/a	●
	n/a	n/a	○	n/a	○
	60/5%	30/15%	30/15%	60/5%	40/5%
	backpack 250 Backup 3.0 DOS	FileSafe V5.2.8-TD	FileSafe V5.2.8-TD	TapePort Backup 1.0 DOS	Central Point Backup 7.1 DOS
	backpack 250 Backup 3.0 Windows	FileSafe 6.1 for Windows	none	TapePort Backup 1.0 Windows	Central Point Backup 7.1 Windows
	●	●	●	●	●
	●	●	●	●	●
	●	●	●	●	●
	●	●	●	●	●
	●	●	●	●	●
	2	1	1	2	1
	●	○	○	●	●
	9	9.5	9.5	13	8
	○	○	○	○	●
	5	1	1	2	14
	800/890-7227 ext. 200, 815/756-3411	800/458-0300, 408/438-6650	800/458-0300, 408/438-6650	800/422-2587, 216/349-0600	800/422-2587, 805/583-5255
	645	646	647	648	649

For more information about all products in this table, circle reader service no. 902.

The Exabyte SCSI tape drive was reasonably quick, taking less than 18 minutes to complete the 138MB full backup, and it completed a 550MB full backup in about an hour. Exabyte insists that this drive has a much greater performance potential and that it will be aided by the new software it plans to ship. We can't verify the company's claims, however. We think it likely that in a typical business setting, you'll do about as well with the floppy interface products. So your decision to use SCSI or floppy interface products should depend mostly on price and your capacity needs.

Don't discount the importance of toll-free technical support, especially if you've never hooked up a tape drive before. IBM is the clear leader here, offering both 24-hour toll-free tech support and a quick one-day turnaround on factory repairs. Memorex offers 24-hour replacement of malfunctioning drives; Iomega will match this service if you buy coverage for $35. All but Wangtek offer adequate turnaround repair times of five days or less.

When it comes to the warranty, expect either one year or two, depending on the vendor. Iomega stands alone in providing a five-year warranty on its tape products—this proved to be the deciding factor for the Best Buy. The Memorex and MicroSolutions products (which are manufactured by Iomega) would otherwise have tied with the Iomega products for Best Buy status.

Backing Up to a Best Buy

How do you define the ideal tape backup package? Price and warranty are two strong selling points, but the software provided also has to be top-notch. All these tape bundles are acceptable, and many are quite good. But only the Iomega Tape250 Internal and Parallel versions strike the special balance it takes to earn a Best Buy. These products are well priced at $189 and $325, respectively, and they provide both easy-to-use and reasonably full-featured software along with a fantastic five-year warranty—protection that none of the other products match.

Don't get us wrong—the competition was fierce. At $179, the Memorex Tape Backup System is well priced, and it was fastest overall. Only a few software limitations keep it from earning a Best Buy. The Colorado Jumbo 250 and Conner TapeStor 250 are internal backup drives with a temptingly low $159 price. After we surmounted the initial installation problems with the Jumbo 250, only the bundled software's deficiencies held it back from a Best Buy. As with the Jumbo 250, the Conner's software deficiencies keep it from the top rung. If Conner makes good on its promised improvements, the TapeStor will also be a winning package. But tape drives take time moving through sales channels, and it's likely that some of the older packages will remain available through some dealers for months. If you don't already own a satisfactory tape backup program, call Conner to learn where you can find the updated bundle.

Colorado's $350 Jumbo Trakker 250 and MicroSolutions' $339 backpack 250 are both highly attractive parallel port models. If Iomega's parallel port unit hadn't distinguished itself with its five-year warranty, all three products would be sharing Best Buy status. After taking a comprehensive look, it's encouraging to see the strength of the internal and external tape drive packages reviewed here. It just goes to show that backing up's easier than ever.

Rex Farrance is an associate editor, Anita Hamilton an assistant editor, and Susan Silvius a senior analyst for PC World.

Imagine the Possibilities

The sky's the limit with Altima Systems' *new* **Virage** notebook. Made to order for you in over 300 notebook configurations, the Virage's modular design keeps up with your ever changing computer needs. Plus you can upgrade at anytime.

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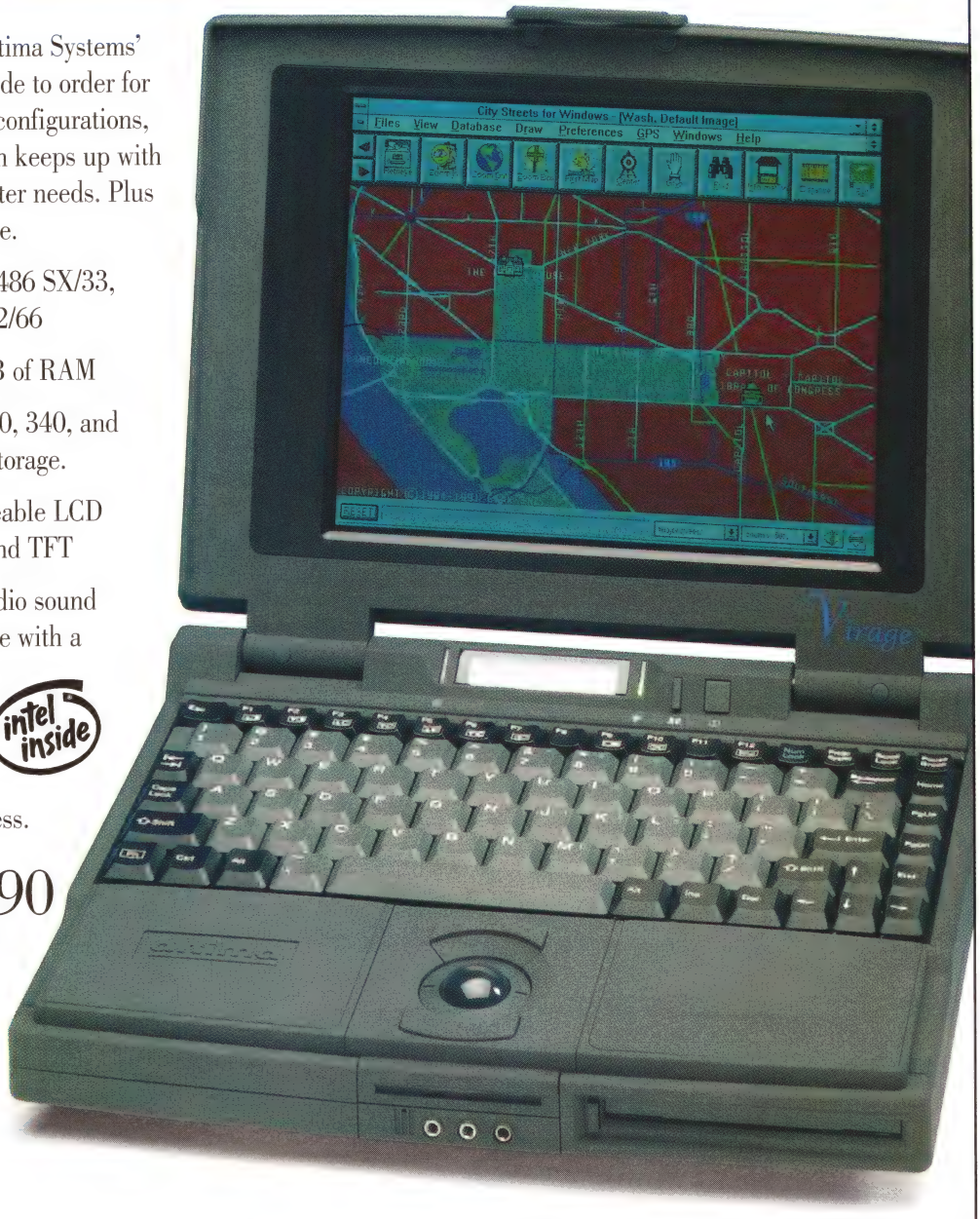

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FROM THE COMPANY THAT TAUGHT THE WORLD HOW TO COMBINE POWER AND AFFORDABILITY:

LESSON TWO.

intel inside

When we introduced the Compaq ProLinea, it was more than just a new computer. It was a whole new idea. The first computer to deliver the right features and high quality at a price that was affordable for everyone.

And now we'd like to build on that idea. Introducing our newest ProLinea: A computer that's been designed to make your money go further still.

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And while we made the ProLinea easier to work with, we also made it easier to own. It meets Energy Star standards, to save money in the long run. Better still, it's priced to keep your costs down today—starting at only $950.* That, of course, includes all the benefits of owning a Compaq, from our free three-year warranty** to our free 24-hour helpline.

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It's a moment in computer history everyone can savor — as Compaq raises the value of a dollar once again. COMPAQ

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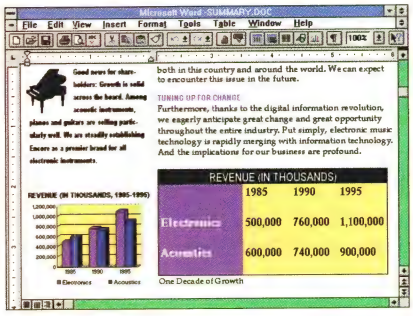
Circle 47 on reader service card

A MILLION WORDPERFECT MICROSOFT WORD. MAKE

More and more people are coming aboard the most popular word processor for Windows.™ That's understandable. After all, Microsoft® Word is the world's best-selling word processor.

As well as the most acclaimed. *InfoWorld* recently stated, "We found Microsoft Word 6.0 for Windows to be the best all-around word processing program." In addition to this, *PC Magazine* has referred to it as "...probably the most elegant and powerful word processor ever written."



With just the click of a button, Word's custom toolbar lets you add graphics, make tables, and bring in data from other programs.

We've also made switching to Word extremely convenient. As a million WordPerfect® users found out, Word not only converts their old files with the formatting intact, but allows you to type in familiar WordPerfect commands, while showing you the corresponding Word command. So you can learn as you work. All the time discovering features in Word that weren't available to you before.

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Enter AutoCorrect. It can fix

*Microsoft support is no-charge; however, normal telephone company charges apply. Microsoft support services are subject to Microsoft's then-current prices, terms, and conditions, which are subject to change without notice. WordPerfect charges SRP and for rebate upon acquiring Microsoft Word 6.0. Word 6.0 will search your system to confirm your eligibility for this special upgrade edition. Offer good only in the 50 United States. Microsoft Office Professional edition includes: Microsoft JCU. For information only: In Canada, call (800) 563-9048; outside the U.S. and Canada, call your local Microsoft subsidiary or (206) 936-8661. Customers who are deaf or hard of hearing can reach Microsoft text telephone (TT/TDD) services by Publishing Company L.P. © 1994 Microsoft Corporation. All rights reserved. Microsoft, Microsoft Access and PowerPoint are registered trademarks and IntelliSense and Windows are trademarks of Microsoft Corporation. WordPerfect is a registered

USERS HAVE MOVED UP TO THAT A MILLION AND ONE.

your misspellings and common typos as fast as you make them.

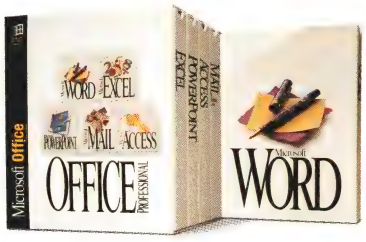
Teh → The

And AutoFormat, which creates great-looking documents at the click of a button. Instantly.

Meanwhile, Word is a part of the Microsoft Office, where every program works together like one. So now it's even easier to share data between programs without leaving your document. It's simply our OfficeLinks integration that lets you focus on your work, not on finding your tools.

There's something else you get with Word that's becoming increasingly rare. Something that WordPerfect has walked away from: unlimited product support with no service charge.* Support so good that the Information Technology Association of America has awarded Microsoft their 1993 award for quality. (For WordPerfect users there's a phone number to make switching even easier.)

To make the move to Word more inviting, you can now upgrade for only $99.** For a reseller near you, call (800) 894-6642, Dept. JCU. And you'll see why so many former WordPerfect users have set a new course with Word.



Microsoft Office

for unlimited product support after 180 days. **Pricing based on $30 rebate off $129 Upgrade SRP. Reseller prices may vary. Licensed users of WordPerfect, other competitive word processors, and previous versions of Microsoft Word qualify for $129 Excel, Word, the PowerPoint® presentation graphics program, the Microsoft Access® database management system, and a Mail workstation license (server and software must be acquired separately). In the 50 United States, call (800) 894-6642, Dept. calling (800) 892-5234 in the United States or (905) 568-9641 in Canada. Quotes used by permission. Reprinted from *InfoWorld*, February 7, 1994. © 1994 International Data Group. Reprinted from *PC Magazine*, February 8, 1994. © 1994 Ziff-Davis trademark of WordPerfect Corporation.

The Map to

From mutual fund ratings to government regulations, a wealth of

DOLORES FAIRMAN

They call it the information superhighway, but I've driven gravel roads between Pikeville and Hazard, Kentucky, that are more direct and easier to navigate. Maybe it's still under construction, but buried among the potholes, detours, and overused road metaphors is an online world of valuable business information. How do you track it down?

To find out, I undertook three research projects that represented fairly typical business scenarios. First, I tried to unearth everything a trucking company would need to know about government regulations. Then I put myself in the shoes of a stockbroker, researching funds and companies. Finally, I played marketing consultant, examining demographic and trademark information in preparation for launching a new water toy.

I conducted my research at 9600 bps during regular business hours, looking for the information I needed on America Online, CompuServe, Dow Jones, GEnie, and (via Delphi) the Internet. I skipped Prodigy—a big player in the home market—because it lacks the depth of information a business professional needs.

The winner? CompuServe, by a wide margin. It was the only service on which I consistently found all the information I needed in a concise and manageable form.

Finding the Regulations

In some businesses, keeping up with government regulations can mean the difference between success and bankruptcy—or jail. To protect yourself best, you need access to government documents as well as national and local news. For my first project, I set out to find all the information that a trucking company would require about shipping hazardous waste in the Southeast—regulations and policies, plus up-to-the-minute regional news.

America Online (AOL) has a reputation for being easy to use—well deserved, as it turned out. If I couldn't find it right away on AOL, it probably wasn't there.

I had no idea where to start, so I tried the keyword **environment** and found myself in the Environmental Forum, where I located the

Online Gold

information is available online. Here's where to find it. BY PETER SCISCO

Network Earth Resource Library. Browsing the Wastes & Toxics topic, I discovered some useful background information on landfills, recycling, and waste management throughout the country. Unfortunately, much of this information was out-of-date—some of the items had been posted for as long as five months.

AOL's opening screen displays a newspaper icon, and sure enough, clicking on that icon brought me to its news service. A simple search for stories containing the words *hazard* and *waste* uncovered only one (not very useful) article. But a search for the single word *waste* revealed 24 entries from UPI, Business Wire, and PR Newswire. The headlines for about a half-dozen entries looked promising, so I selected those and saved them to disk. After reading them offline, however, I found they didn't give me the local angle I was looking for.

AOL resources are cheap and easy to find, but the information just wasn't extensive enough. And downloading text files from AOL was a hassle: I had to bring up the articles on screen before saving them to my hard disk. AOL may have improved its downloading capabilities by the time you read this. *Grade: C*

CompuServe Information Service (CIS) was my next stop. Users can dial in to CIS through either a generic communications program or a specialized front end—an easy-to-use program designed specifically for CompuServe. I chose CompuServe's own front end, Information Manager for Windows, also known as WinCIM.

Using WinCim, I typed **go ius** to get to Information USA, a guide to government agencies and publications. I moved through the Business and Industry and General Transportation selections until I uncovered some promising titles. A quick scan gave me the address and telephone numbers of such agencies as the Office of Hazardous Materials Transportation—Research and Special Programs Administration.

For local topical information, I used News Source USA (**go newsusa**), an electronic library of more than 60 national and regional newspapers, as well as business and general-interest magazines. This can get pricey, though—from $1 to $5 per search,

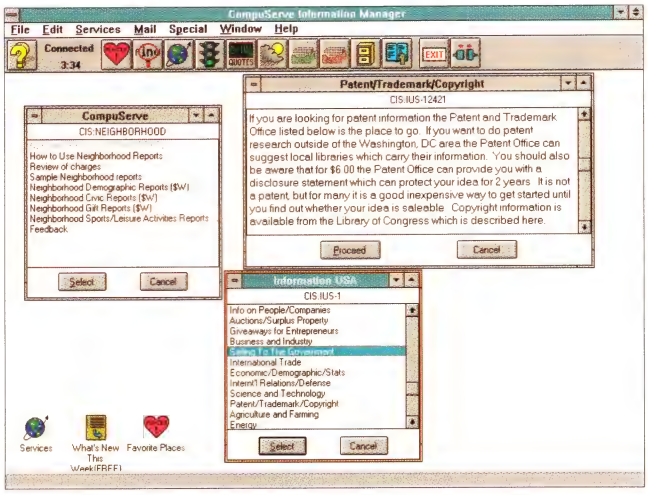
not including the regular connect charges. Luckily, News Source USA pays specialists to stay online and help you find what you're looking for. I narrowed my search by region, then selected two daily papers, the *Atlanta Constitution* and the *Charlotte Observer*, that would help keep me informed about local events.

CompuServe's guide to government sources is especially valuable, and its selection of newspapers is exceptional. The logical keywords and the well-designed menus make for quick and painless searches. *Grade: A*

Delphi Internet Services is one way to hook into that web of international computer networks that you've been hearing so much about lately. No one owns the Internet, and the information on it is often disorderly and difficult to find. The Internet itself doesn't cost anything, but realistically speaking, you will have to pay someone to let you on to it.

I paid Delphi, an online service that offers full Internet access for $3 a month, in addition to its regular connect rates. (Delphi said at press time that it is planning to drop the Internet charge.) New Internet access services are popping up all the time (America Online and CompuServe may have them when you read this). But at the time of my research, Delphi made the most sense.

For a Windows user accustomed to America Online or CompuServe's WinCIM, prowling the Internet is like spelunking without a lamp. But you can throw a little light on the subject by using Gophers—standardized, menu-based interfaces to Internet resources. Not everything on the net is accessible through Gophers, but you'll find it easier to get to the stuff that is.



COMPUSERVE: Neighborhood Reports offers some great demographic information, ranking the buying habits of a selected ZIP code area.

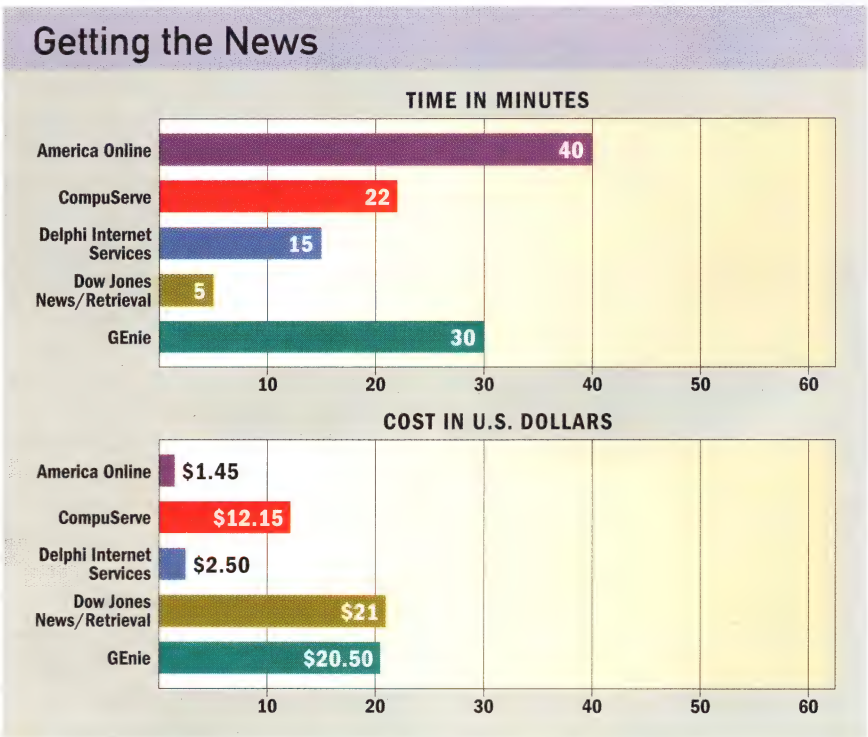
The reams of information available on the Internet can be overwhelming. Selecting the Libraries, Guides, and Research menu on Delphi's Gopher got me to the Clearinghouse of Subject-Oriented Internet Resources. A search for **hazardous waste** gave me access to an Environment Guide, where I found an electronic report titled "A Guide to Environmental Resources on the Internet." I downloaded and browsed the guide, marking promising files for later downloading. Then I logged on again and browsed the EPA's online library through Gopher's Government and Politics selection. Several titles beckoned, but after I examined them, I realized they didn't give me the information I could get from other online sources.

For a news connection, I checked out the Electronic Newsstand (**enews.com** on Delphi's Gopher), a collection of publications ranging from general-interest magazines like the *New Yorker* to avant-garde 'zines like *Factsheet Five*. I found *Earth Magazine* and *E Magazine* there, but nothing like the selection of local newspapers and trade magazines that is offered on either Dow Jones or CompuServe. *Grade: C–*

Dow Jones News/Retrieval (DJN/R) is designed from the ground up for the business user. With more than 1600 national and regional publications online, including the *Wall Street Journal* and the *New York Times*, as well as trade publications, analyst newsletters, and government documents, DJN/R is a treasure trove of useful information—at least, once you learn to use it.

The first trick is to enter the command **$% textm**, which brings up a search menu that's a big improvement over DJN/R's command-line interface. Even better, you can order a copy of TextSearch Plus and News/Retrieval Link, Dow Jones's own free, Windows-based search-and-retrieval program.

Once you can find your way, there's plenty to see. For instance, I found Hazmat Transport News, a biweekly trade magazine, particularly useful. But while DJN/R excels in offering publication resources and analyst reports, it lags in government information. Clearly, the service is designed for



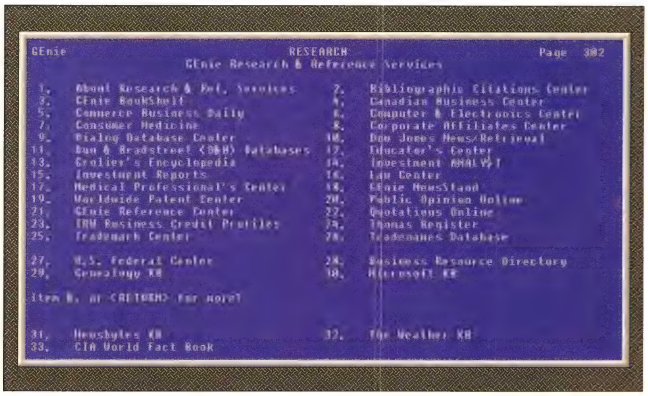
FOR UP-TO-DATE INFORMATION, I downloaded five articles from newspapers, trade magazines, or analyst reports on all five services. America Online took the longest but cost the least.

Online Scorecard

	FINDING THE REGULATIONS	MAKING GOOD INVESTMENTS	PLANNING YOUR STRATEGY
America Online	Easy-to-find but shallow information.	Excellent, easy-to-use summaries; lacks detailed info.	A washout.
CompuServe	Plenty of government documents and topical, regional news.	Complete financial reports that are easy to search through.	Detailed demographic, census, and trademark data are well presented.
Delphi Internet Services	Too much background information; inadequate news.	A difficult interface blocks easy access to limited financial reports.	Lots of information at a good price, but hard to sift through.
Dow Jones News/Retrieval	Terrific news and trade sources, but no government documents.	Extensive, easy-to-search reports, but they're expensive.	Great demographics; no trademark info; prohibitive cost.
GEnie	Great government and news sources, but costly and difficult to navigate.	Good at financial reports and business summaries; needs a strong mutual fund partner.	Demographics information okay; trademark search terrific.

topical research (up-to-the-minute in some cases, a month after publication in others).

The breadth of resources and the powerful search utilities keep Dow Jones News/Retrieval competitive with other online resources—at least when you're looking for business news. But at $1.50 for every kilobyte of downloaded information, the charges can add up quickly: Five minutes online cost me $21. *Grade: B*



GENIE'S REFERENCE MATERIALS cover a broad area, but the interface demands preparation. A Windows version is expected this year.

GEnie (General Electric Network for Information Exchange) has an interface only a big-iron mother could love. While other services have embraced the Windows world, GEnie forces you to type commands like m600;11. The menus help a little but not much (there should be a Windows front end by the end of this year). In the meantime, you can download Aladdin (**m1465;3**), a front end that automates some tasks.

Despite the difficult interface, GEnie is hard to beat for onetime research projects. Its connection to Dialog Information Services, with access to government and legal databases, economic reports, and other resources, makes it possible to find information on almost any topic.

I started searching in the U.S. Government News & Regulations section, where I found more than 1700 entries containing the term *hazardous waste*. I managed, by adding specifics, to narrow my choices to 54. Dialog sorts the records by date and charges for each record retrieved. I kept costs down by downloading the first 20 records—figuring that these would be the most recent.

With record 13, I hit pay dirt. It was a document from the *Bureau of National Affairs Daily News* describing proposed guidelines for training workers who come into occasional contact with hazardous waste. I asked for the full text of the article, which I captured and saved to disk.

Further research led me to local newspapers, grouped by region. Under the Southeastern menu, I was able to select the *Charlotte Observer*. I uncovered 11 stories in 1994 related to hazardous waste, one of which I downloaded in full form.

The information found on GEnie is equal to anything on CompuServe or DJN/R. But GEnie is hard to use and expensive enough to make a bean counter sweat. Novice researchers who are prone to browsing can rack up heavy charges before their online sessions are through. I should know; my hazardous waste research ended up costing $18.50. *Grade: C+*

Making Good Investments

If you know how to use it, a modem can bring Wall Street right into your office. Comprehensive, timely, and accurate information is the name of the game when it comes to playing the market, and online services can bend the rules in your favor.

For my second research project, I set out to find information on emerging market funds in the Pacific Rim. To complicate things a bit, I also investigated small companies active in the consumer-electronics and interactive-entertainment markets.

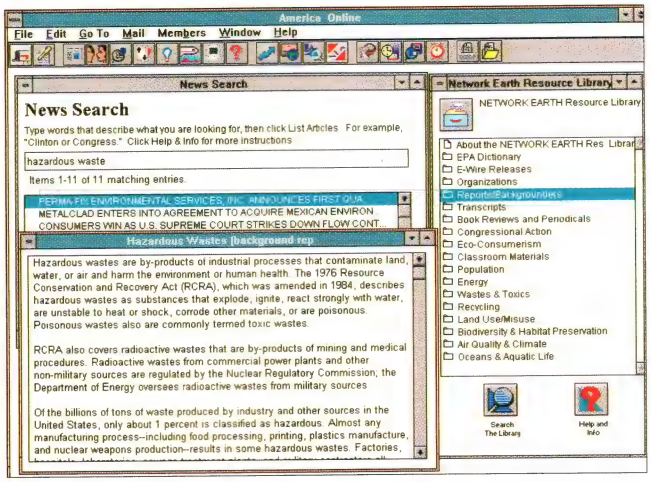
America Online isn't a stockbroker's dream, but it does have the Morningstar Mutual Funds forum (keyword: **morningstar**). Morningstar's ratings are well respected, and the information will let you compare the long-term performances of different funds. I found several tables on the Pacific region's 25 top-performing mutual funds, with information covering three-month, one-year, five-year, and ten-year performance periods.

But AOL wasn't much help when I needed to know about specific companies. I found summary reports from *Hoover's Handbook* in the Business and Finance section (keyword: **business**), but they offered only a glimpse of the more than 900 companies included. Not bad for the casual investor, but AOL lacks the depth of resources a broker needs to make those Beemer payments. *Grade: B–*

CompuServe proved to be the right place for the serious investor. If you want a quick return, go to the dog track—a good investment is one that meets a planned goal. And the best place I've found to match investments with goals is *Money* magazine's FundWatch Online (**go fundwatch**), a CompuServe database on more than 1900 mutual funds.

This is more than a list. You can search out the funds that match a set of goals you define; the funds are then rated according to how well they meet those goals. I found a Pacific-based international fund that returned better than 5 percent in the latest bear market. The fund's 5 percent load fee (to cover management expenses) was a little steep, but I downloaded the information anyway for later consideration.

For information on consumer-electronics companies, I leaped over to Disclosures II (**go disclosure**), where I found 10K and 10Q financial reports, summaries of company officers, reports on insider holdings, and other financial data culled from public documents filed with the Securities and Exchange Commission (SEC). The prices for searching a company's records range from $5 to $17 and can include everything from the salaries of top officers to financial statements. *Grade: A*



AMERICA ONLINE: It's easy to search the new files on AOL, but the information isn't as comprehensive as on other services.

Delphi Internet Services offers good but not great financial information that's all but impossible to get in a usable form. I found the best results—such as they were—at the net's Edgar Project, which provides public access to the SEC's electronic filings.

You get there by selecting the Government and Politics option on Delphi's Gopher—Business and Economics would be too easy—then choosing the Edgar Dissemination Service. For a specific company's SEC filings, you need to download Edgar's company index, locate the company you want (there's no guarantee it will be listed), make a note of the file, then go back online to download it.

To find other investment resources, I brought up a Gopher tool called Veronica, which searches Gopher menus by keyword. A search on Nasdaq in the University of Texas at Dallas Gopher revealed performance ratings and stock quotes for various companies, but the information was 48 hours old. By comparison, equivalent data on the other services was delayed by only about 15 minutes or, in the case of DJN/R, not at all.

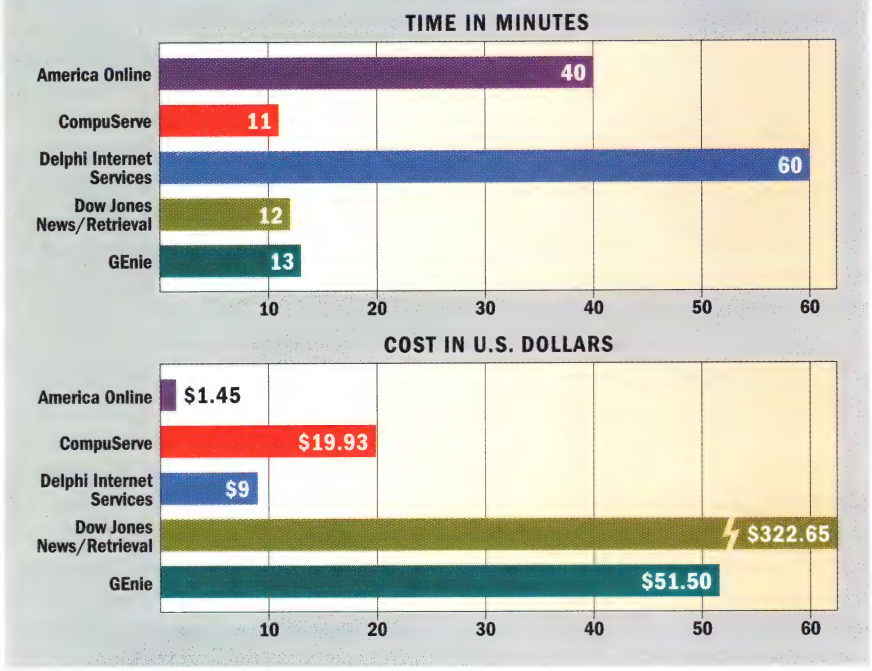
The Internet doesn't arrange information for easy searching. If you want something fast, and you can't search by company name, stick with CompuServe, GEnie, or DJN/R. *Grade: D*

Dow Jones News/Retrieval is one terrific investment tool. It offers a full array of financial market information, from stock quotes to SEC filings to analyst reports, all ready for you to search and examine.

The command **$% funds** brought me the Mutual Funds Performance Report from Media General Financial Services, a great place to measure the performance of more than 1500 mutual funds. I was interested in the top-performing funds in the Pacific Rim, so I selected *Investor Objective•International (doesn't include U.S. Stocks)* from the main menu. In a few minutes, I had performance information for scores of mutual funds, many of them active in Pacific Rim nations.

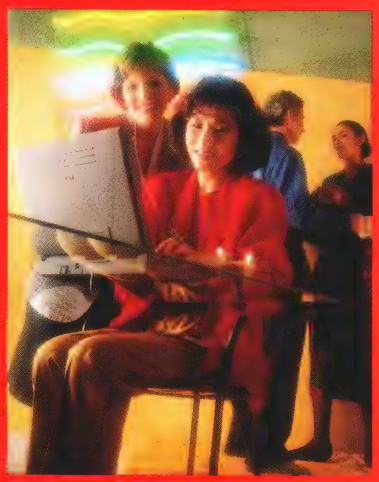
To obtain consumer electronics information, I used **$% reports**. That took me to the Company Reports menu, where I could choose from SEC filings, analyst reports, and other sources. Using Media General Financial Services Company & Industry Data (**//mg** from any prompt), I was able to research companies by name or industry classification—or even by growth rate and number of employees. I could combine

Timely Stock Information



I LOCATED THREE TOP-PERFORMING MUTUAL FUNDS in the Pacific Rim market on each service and downloaded a full financial report for a public company. The information I found on the Internet and GEnie was not entirely satisfactory.

Introducing the Globalyst™ Family of PCs



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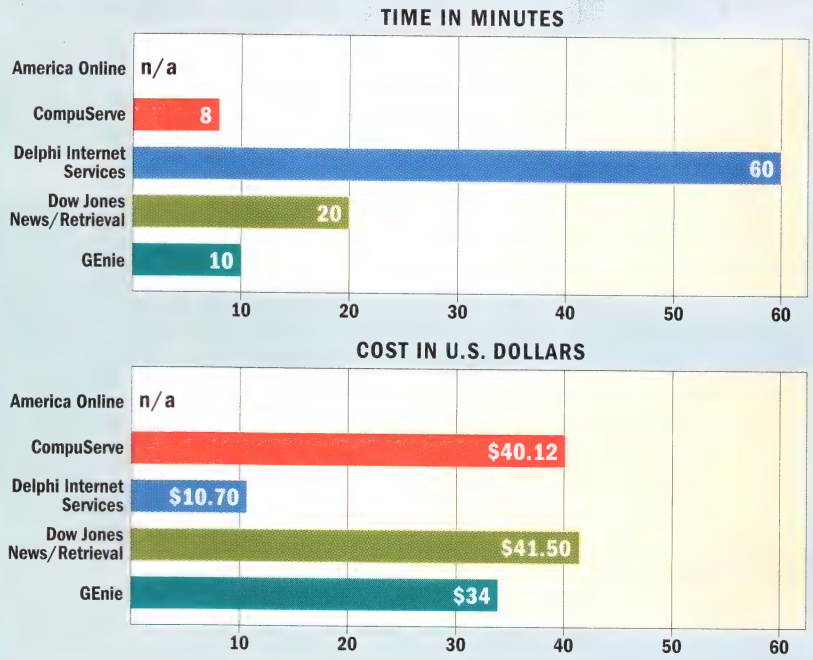
these criteria to find just the right match.

DJN/R charges for information rather than connect time, and at $1.50 for every 1000 characters that come across your screen, the cost of data can add up fast. For instance, the searches for financial data ran up a tab of almost $120. To keep costs down, you should do your free-form exploring on CompuServe first, then log on to DJN/R when you know exactly what you want. *Grade: B+*

GEnie costs less than Dow Jones, but it's a weak tool for researching mutual funds. I found some useful information—investors discussing foreign stock investments and general mutual fund performance, for instance—in the Investors Roundtable (**invest** at the prompt), but nothing like CompuServe's FundWatch Online and FundWatch Mutual Funds Performance Report. Not that it's a complete loss. GEnie is as flexible as Dow Jones when you need financial reports on public companies, letting you search by company name, standard industrial classification (SIC) code, and description. Still, GEnie doesn't measure up to the competition as an investment tool. *Grade: C–*

Demographics and Trademarks



IN THE GUISE OF A MARKETER, I searched for demographic analyses of a given area, as well as for registered trademarks, on all five services. The Internet and Dow Jones information was not entirely satisfactory, and America Online gave me nothing worthwhile.

Clip Job: Making Your Own Newspaper

How often do you have time to read the daily newspaper? And even when you do, does it have all the news that's important to your life and business?

Well, you can now get all the news that fits into your tight schedule—delivered right to your PC. At least that's the idea behind online news-clipping services.

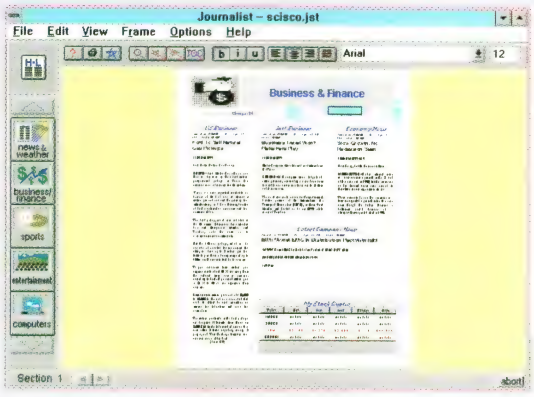
The most ambitious effort is the Dow Jones Clipping Service. You create up to ten electronic folders, each of which can be defined by source (including the *Wall Street Journal* and other national papers) and subject. You can use up to five search terms—found in the text, headlines, or lead paragraphs—to define your stories.

Once you're set up, DJN/R will deliver your customized news to one or more online folders, transmit it to your fax device, or wire it to your E-mail account on MCI Mail, AT&T Mail, EasyLink, or SprintMail. Each folder costs $15 per month, in addition to the regular DJN/R fees.

CompuServe and GEnie also offer clipping services, although they're not in DJN/R's league. CompuServe's Executive News Service is pretty decent; it searches through UPI, AP, and Reuters sources for $15 an hour plus regular connect charges. GEnie's less impressive QuikNews provides news only from Reuters World Service, Reuters Business Report, and Newsbytes (for computer-related news). AOL doesn't offer a clipping service at this time.

If you want your newspaper to look like a newspaper, consider Journalist, a Windows clipping program by Ped Software. Journalist lets you design a newspaper layout and select the kinds of stories you want printed in it. Then, when you need your news fix, you can dial in to Prodigy or CompuServe (separate versions are available for each), and wait as Journalist retrieves the day's relevant stories from the Reuters news wires.

And wait. When it comes to getting a story, Journalist is slower than Jimmy Olsen. You can probably dress, drive down the block for a copy of the *Times*, and be back to enjoy your coffee before Journalist comes off the electronic press. But at least it's wasting the computer's time instead of your own. • *Journalist $129.95; Ped Software Corp.; 800/548-2203, 408/253-0894, 408/253-1062 (fax). Reader service no. 786*



PERSONALIZED JOURNALISM: Journalist lets you design your own newspaper layout, then fills it with stories from CompuServe or Prodigy.

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Say that you want to browse through all your data to find some sales totals. Click. AutoFilter shows you just what you want.

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*Microsoft support is no-charge; however, normal telephone company charges may apply. Microsoft support services are subject to Microsoft's then-current prices, terms, and conditions, and subject to change without notice. Microsoft Offic separately). In the 50 United States, call (800) 894-6642, Dept. 6SP. In Canada, for information only, call (800) 563-9048. Outside the U.S. and Canada, call your local Microsoft subsidiary or (206) 936-8661. Customers who are deaf or hai the Windows logo are registered trademarks and IntelliSense, TipWizard, PivotTable and Windows are trademarks of Microsoft Corporation. Lotus and 1-2-3 are registered trademarks of the Lotus Development Corporation.

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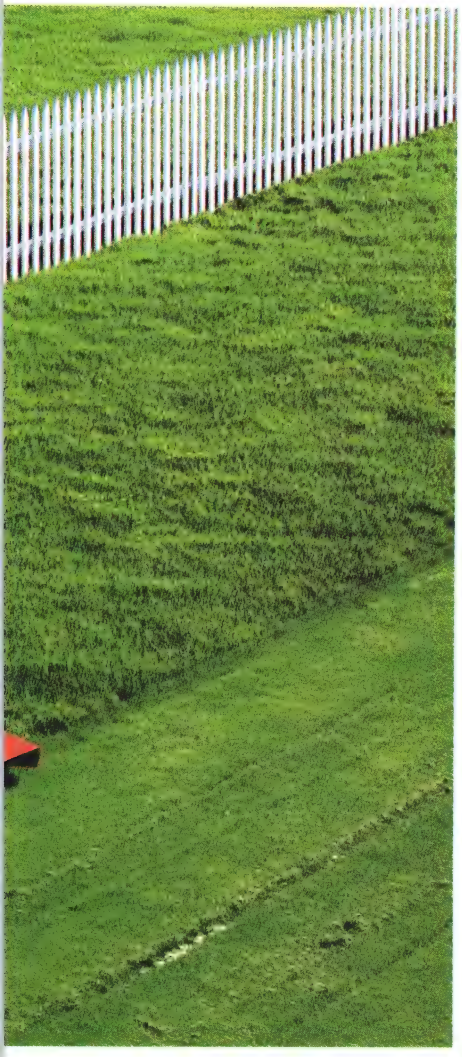

Then expand or collapse the details of your worksheet with the Outlining buttons. Instantly. Like no other spreadsheet can.

Think about the analysis you do. Only Microsoft Excel gives you such easy, powerful access to information. With our PivotTable™ Wizard, it's a cinch to pull your raw facts into a clear summary report.

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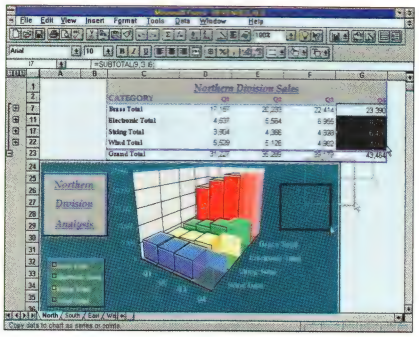

Instantly update your charts with Drag-and-Plot. Just drag in new data and you're done.

from different points of view—by product, region, quarter, whatever. Just drag and drop different headings to rearrange your report. As you go, your figures are immediately recalculated. So you see them in a whole new way.

Of course, Microsoft Excel is another smooth-fitting piece of the Microsoft Office, where the programs work together like one.

After creating a table or chart in Microsoft Excel, you can just drag and drop your work into Word.

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It's this OfficeLinks integration that lets you focus on your work, not on finding the tools you need.

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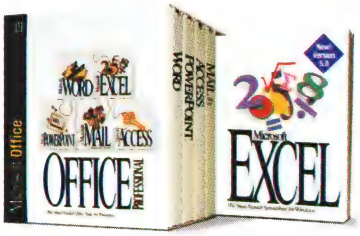
And if you're a former Lotus® 1-2-3® user, relax. You can directly transfer files, even run existing macros. Easily. Enter a Lotus command and the Help for Lotus users feature lets you automatically see the Microsoft Excel equivalent.

So swing by your nearest dealer or call us at (800) 894-6642, Dept. 6SP. You'll see why the grass is greener on this side of the fence.



Microsoft Office

rofessional, shown here, includes: Microsoft Excel, Word, the PowerPoint® presentation graphics program and the Microsoft Access® database management system and a Mail workstation license (server and software must be acquired
f hearing can reach Microsoft text telephone (TT/TDD) services by calling (800) 892-5234 in the United States or (905) 568-9641 in Canada. © 1994 Microsoft Corporation. All rights reserved. Microsoft, Microsoft Access, PowerPoint and

Planning Your Strategy

For my final project, I decided to take on Madison Avenue. After all, with a modem, everyone is well connected. I pretended I was planning to introduce a new water toy into a local summer recreation market. That meant studying demographics to see if the market was right and researching existing trademarks to avoid getting sued.

America Online has nothing to offer in the marketing arena. Headlines won't cut it when you're trying to break out a new product, and there simply are no details to be found. *Grade: F*

CompuServe's wealth of demographic and government information can turn anyone into a marketing guru. To start out, I tapped into Neighborhood Reports (**go neighborhood**) for a breakdown on the gift-buying habits and leisure activities of people living in my Metropolitan Statistical Area—a region of 1 million or more people as recorded by the U.S. Department of Commerce. These reports cost $10 per ZIP code plus regular connect charges, but you can't get this kind of data offline without hiring a pollster.

Next I checked out Business Demographics Reports (**go demographics**). These reports, which also cost an extra $10 each, show you how people in a particular ZIP code make a living. Between these and Census Data (**go cendata**), I got a good sense of my chances for success. Just try that with a call to the Chamber of Commerce.

For trademark information, I typed **go traderc**. This linked me to Dialog Information Services, which includes the registered trademarks in all 50 states and Puerto Rico. Prices range from $1 if it finds nothing to $10 for a search of up to five trademarks. Downloading the complete record of a trademark costs an additional $5. That may seem expensive, but it's cheaper than court costs, legal fees, and repackaging. *Grade: A*

A Civilian Surfs the Internet

Surf the net. It's the mantra du jour of the cyber masses. Flip on your TV, pick up any newspaper, or scan your radio dial, and you're bound to catch someone waxing poetic on the wonders of surfing the Internet's virtual waves. There's just one catch: Unless you're comfortable with arcane UNIX commands and indecipherable addresses, the Internet is a tough ride.

Or rather, *was* a tough ride. The past tense is due to Mosaic, the hip new tool of net nerds in the know. Mosaic provides a simple, graphical window on the Internet by hooking into the World Wide Web, a collection of thousands of Internet-savvy servers running specialized software. You can find almost anything on the Internet through the Web, which links and indexes databases, files, and other resources, integrating them into a single "seamless hypertext information space."

And Mosaic was built to navigate that information space. Developed at the National Center for Supercomputing Applications (NCSA), Mosaic uses a menu-based interface to guide users to their desired location on the net, consolidating the various Internet navigation utilities into one. To access the Library of Congress card catalog with Mosaic, for instance, you simply drop down a customized menu and select *Library of Congress;* a few seconds later you're connected. By taking advantage of standardized Web addresses—which can point to units of information as small as a single page or file—Mosaic deals with site addresses, log-on names, passwords for file retrieval, and other such ephemera.

Mosaic reads documents written in Hypertext Markup Language (HTML)—generally, ASCII text with embedded characters designating titles, headings, and links to other files and documents. HTML documents display on screen as WYSIWYG pages, complete with icons, boldface and italicized text, and graphics. More important, you can link any word, icon, or other object in an HTML document to other files, images, or documents located at any site that uses Web software. Mosaic also allows users to retrieve linked graphics, sound clips, and video fragments, and (over sufficiently high-speed, direct Internet links) to display real-time TV broadcasts.

City Tours and Coke Machines

Mosaic's links can take you to the Netherlands, Germany, England, Hong Kong, Japan, South America. Planning a trip to Passau, Germany? Just log on to the server at the University of Passau, and one click gives you an aerial view of the city. Click on a section and you zoom in on that part of the street grid. There's also a guided tour of the city (though the explanatory text is in German).

The list of potentially valuable Web resources would run thousands of pages. A server in North Carolina, for instance, holds a database of 1993 White House press releases. Cornell Law School offers a hypertext version of the U.S. Copyright Act, the Patent Act, and the Uniform Commercial Code. The University of Illinois has an MPEG video clip of the starship *Enterprise* soaring up into the sunset. (At 9600 bps, it takes roughly 15 minutes to download the *Enterprise* clip; via a digital T1 line, about 30 seconds.) A "Weather Machine" server supplies up-to-the-minute satellite weather photos, while the Internet Shopping Network lets you browse catalogs and order software for overnight delivery.

On the other hand, browsing the Web can feel a lot like picking through the garbage heap of the Internet hive mind. Carnegie Mellon University, for example, maintains a list of Internet Accessible Coke Machines—actual soda machines wired into the net. You can check on the stock and temperature of cans and even order a drink. (You have to go find

Delphi Internet Services, as I expected, provided a lot of information and no practical way to whittle it down into something understandable. I used the Gopher tool Veronica to find my way to the U.S. Census Bureau's Gopher server, which contains tons of official government demographic information. But once again, you'd have to hire a statistician to interpret it.

If you look hard enough, you'll find additional information. For instance, a site at the University of Missouri holds education and employment records of workers in specific metropolitan areas, but it still lacks the marketing information that CompuServe offers. You can find these Gopher servers listed in the U.S. Census Bureau's Gopher Server menus under the title "Other Servers on the Web That Offer Census Data."

To check trademarks, I used the Delphi Gopher to get the Business and Economics Gopher, and from there burrowed to the U.S. Patent and Trademark Search menu. I then made a quick keyword scan using SuperSoaker, which seemed like a nice original name for my product.

Wrong again. My search turned up 39 separate items that matched my keyword. Some I could rule out; others I had to download for further study. As with anything on the net, you have to put in a lot of time to make your own analyses.

The information is there, and it doesn't cost very much to get it, as long as you have the time to dig through an online haystack. If you want something clear and concise, however, stay away from Delphi and spend the extra money for DJN/R, CompuServe, or GEnie. *Grade: C*

Dow Jones News/Retrieval has Dun's Market Identifiers (**$% dmi**), which is great for scoping out the competition and discovering potential markets. Thanks to the menus and online help, I could easily search out sports and recreation businesses in my area. DMI

the machine to retrieve your order, of course.) A server in Norway lets you type in the name of your favorite rock group and retrieve images of every album cover. And one 19-year-old at the University of Maryland—every bit a sophomore—offers a photo and short bio of himself.

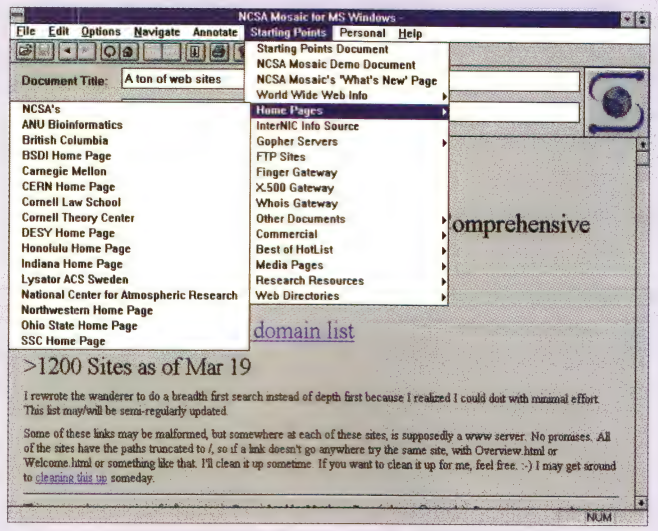
Getting Hooked In

Given the Internet's labyrinth of unfettered infotalent, interfaces like Mosaic provide users with the best shot at ferreting out the truly useful, as well as the truly zany. Those who already have access to the Internet can easily download a free beta version of Mosaic using a standard UNIX file transfer utility (FTP to ftp.ncsa.edu). And Mosaic's underlying code has been licensed for commercial distribution to half a dozen companies; Quarterdeck Software will release a version in late 1994, and Mosaic—a firm started by James Clark, the Stanford professor who founded Silicon Graphics—plans to produce a modified version. Mosaic is currently available for Macintosh, Windows, and cross-Windows platforms.

If you're ready to take the plunge, be forewarned: The beta version of Mosaic can be tricky to install. You'll probably find that it helps to have a working knowledge of Windows, INI files, and so on. And don't expect much help from the documentation, either; the first person we asked to write this article tried for a week to install the program and finally gave up.

Besides patience, time, and a copy of Mosaic, you'll need two things to surf the net:

- **TCP/IP. If you have a TCP/IP package such as Chameleon, if your system is attached to a network already running TCP/IP, or if you're running Windows NT or some other operating system that has TCP/IP, you're all set. If not, you'll need to download a public domain package from NCSA called Trumpet Winsock, a Windows-based TCP/IP package.**
- **A "direct connection" to the Internet. Direct links to the Internet come in two main flavors: a high-bandwidth leased line from an Internet service provider to your system or LAN, and a less expensive dial-up link called a SLIP or PPP. Both types are available from national providers such as NetCom, PSILink, and ANS or from most of the former regional NSF backbone network administrators, such as BARRNet and CERFNet. The direct links provide blazingly fast performance, particularly useful for accessing graphics, video, and sound. SLIP and PPP accounts, which are constrained by modem speed (yours and the service provider's), typically top out at 14.4 kbps. Still, they're serviceable—and cheap. My San Francisco–based dial-up SLIP account costs just $19.50 per month and $2 per hour. Some online services—such as Delphi—provide direct Internet access. Currently, however, these services offer only text-based interfaces and won't let you run Mosaic.**



INTERNET AT YOUR FINGERTIPS: NCSA Mosaic lets you customize menus for point-and-click access to your favorite resources.

The Killer Internet App?

Mosaic, with as many as a million users already, has the Internet intelligentsia all abuzz. Now that 56-kbps leased-line access is available for as little as $400 per month and T1 access (1.5 mbps) runs about $1000 per month, even small companies can afford to get wired. With governments, universities, corporations, libraries, and individuals rapidly making their information accessible through the Web, the incentive to explore Internet space has never been greater. And possibly as early as December 1994, the Internet will get yet another big boost. According to Microsoft, the next version of Windows, code-named Chicago, will ship with built-in TCP/IP and PPP. Smart money says the combo of Chicago and Mosaic will likely do for the Internet what 1-2-3 did for spreadsheets.

—Thomas Gewecke

Is the Cyrix Upgrade Chip r Just ask

"Does your PC have an Intel 386DX? If so, the Cyrix Cx486DRx[2] is your only choice."

–Windows, February 1994[3]

"Another potentially interested Cyrix customer is the corporate buyer... The buyer's budget can't handle 20 new 486-class PCs, and there isn't the time to do motherboard swaps on all of them, either. Enter Cyrix and the quick-and-easy 40-65% performance-boost solution."

–Computer Shopper, February 1994[1]

"This Cyrix upgrade is easily fitted in 15 min, and then the user is up and running with all the old software and data files unaffected. There is no learning curve or disruption for the user – it is only necessary to get used to the fact that the computer does everything twice as fast as before."

–Personal Computer Magazine (UK), November 1993

"Simply plug in the Cyrix 486 upgrade to a 386 motherboard and you'll crank up performance by better than 60%..."

–PC Computing November 1993[2]

"Cyrix has developed inexpensive upgrade chips for 386-class personal computers...and the effect will be like dropping a Corvette engine into a Ford Escort... We decided to try one of the Cyrix chips. The result was impressive...Think about how much a small company could save."

–Barry Cooper, The Orlando Sentinel, February 10, 1994

"Priced at under $300, the upgrade will nearly double the performance of that creaky old 386SX a few of you still use."

–PC Magazine, February 8, 1994[1]

"... PCComputing MVP 93 FINALIST ... 1994 WIN AWARD W 100 WINDOWS MAGAZINE ... 1993 BYTE AWARD OF MERIT ... COMPUTE SPECIAL TECHNOLOGY AWARD FINALIST ..."

"True to the company's word, we found Cyrix's DRx[2] an easy upgrade that can deliver a performance boost (to your) wheezy old 386."

–Computer Shopper, February 1994[1]

"The Cyrix Cx486SRx[2] 386SX upgrade chip cleverly does something which everyone thought was impossible...a single-chip upgrade for 386SX machines..."

–Personal Computer Magazine (UK), January 1994

"So what is the bottom line? For only $349, I have probably bought at least two more years of life for a three-year-old PC that I had already written off as obsolete. I consider that to be a pretty good deal..."

–Computer, November 1993, IEEE Computer Society

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386-to-486 eally that good? anyone.

"...dropping in a Cyrix Cx486DRx² Upgrade Microprocessor is a quick way to really push performance."

–WordPerfect the Magazine, December 1993

"...Cyrix gives new life to older 386SX- and 386DX-based computers...This may be the best upgrade solution we've seen yet for users of older machines who don't want to shell out $1,500 or more to move into a new 486-based system."

–Windows Magazine, The Win 100: The Best Windows Products of the Year, February 1994³

"Performing an upgrade on a full-size Toshiba laptop computer required less than two minutes...The system booted without problem and showed dramatic improvements in overall computational performance and disk I/O."

–Computer Reseller News, Joel Shore, August 16, 1993

"Cyrix's solution is simple. You remove the existing 386 chip from its socket, plug in the Cx486DRx² and run some software."

–PC Magazine, October 13, 1993²

"Cyrix's clever design makes it possible to upgrade nearly any 386 in existence, without hassle or high cost...All you need is a fast, affordable upgrade for an office of 386s. The Cyrix Cx486SRx² is it. Just plug it into your s386 system and go."

–PC Computing, December 1993²

"...The performance increase was significantly greater even than what the ad claimed... And the performance bang for the buck–mamma mia! Went through the roof!"

–Raw Bytes, Frank Delaney KPBX FM 91.1, National Public Radio

Your 386 Model	The Upgrade You Need	Suggested List Price
DX 33 MHz	DRx² 33/66	$399
DX 25 MHz	DRx² 25/50	$349
DX 16 or 20 MHz	DRx² 20/40	$299
SX 25 MHz	SRx² 25/50	$299
SX 16 or 20 MHz	SRx² 20/40	$269

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MICROSOFT WINDOWS COMPATIBLE

yes It runs with NetWare

See – the Cyrix 386-to-486 Upgrade Microprocessor really is that good. Now aren't you glad you asked?

Cyrix® instead™

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Circle 92 on reader service card

costs between 50 cents and $45, depending on the kind of report you request, plus regular DJN/R charges.

Using this method, I uncovered more than two dozen possible outlets for my product. Then I asked for a summary report on the four that looked the most promising. All this cost me $31.15.

Dowquest (**$% dowquest**) is another useful tool. Searching with the phrase **summer leisure buying habits,** I uncovered several useful articles. But when it came to hard and fast demographic numbers, DJN/R couldn't match CompuServe's Neighborhood Reports. And trademark information was—as far as I could tell—nonexistent. Still, Dow Jones is pretty good for business-to-business demographic data. *Grade: C*

GEnie led me to demographic gold right away. I simply opened up the Dun & Bradstreet Donnelly Demographics database, located on the Dialog menu. (Don't confuse this with DJN/R's Dun's Market Identifiers.) A search by ZIP code provided summary information, although it was not as detailed as CompuServe's reports.

Product Information

America Online
800/827-6364, 703/448-8700
Reader service no. 685

CompuServe
800/848-8199, 614/457-0802
Reader service no. 686

Dow Jones News/Retrieval
800/522-3567 ext. 69, 609/452-1511
Reader service no. 687

GEnie
800/638-9636, 301/251-6415
Reader service no. 688

Delphi
800/695-4005, 617/491-3342
Reader service no. 689

But GEnie made up for that brevity by letting me scan trade names in the Trademark Center, which carries the registered trademarks from the U.S. Patent and Trademark Center, all 50 states, Canada, and the United Kingdom. Search fees run from $1.25 (no hits) to $7.50 (for up to five trademarks), plus regular connect rates. This one feature, despite the cost, keeps GEnie competitive with CompuServe, and a length ahead of DJN/R. *Grade: B*

End of the (On)line

If you want to deal with just one service, put CompuServe at the top of your list. Its comprehensive research facilities, plus the interaction with other professionals that you find in its forums, make it a formidable business tool. If it had a direct link to the Internet—something that may come this year—it would be unbeatable.

If you're serious about investing, however, you'll want to augment CompuServe with Dow Jones News/Retrieval. The sheer volume of published information you can find there for a reasonable cost almost makes a company library obsolete.

GEnie is an expensive option. To use it effectively, plan your searches in detail. Read the introductions for each database tool and download the search directions (both are free except for connect charges). Make your searches as specific as possible—don't browse your way out of business.

The Internet requires lots of study and a certain amount of humility; it's not the best choice if you need information quickly and you don't know exactly where to find it. But the amount of information the net contains is phenomenal.

America Online is easy to use, but it lacks the databases and the depth of information a professional needs. When AOL completes its work on a direct Internet link, it may become an exciting research alternative.

The online world is becoming an exciting and informative place. Think how nice it will be when they finally have it paved.

For more information about all services in this article, circle reader service no. 903.

Peter Scisco is a North Carolina–based freelance writer, itinerant cybernaut, and unrecovered infojunkie. Thomas Gewecke is the director of sales and marketing for PC World Online.

FEATURES COMPARISON

The Line on Online Services

● Yes
○ No
n/a = not applicable

	America Online	CompuServe	Delphi Internet Services	Dow Jones News/Retrieval	GEnie
Fees					
Monthly rate	$9.95[1]	$8.95[2]	$13 to $23[3]	n/a[4]	$8.95[5]
Hourly prime-time fees[6]	$3.50	$4.80 to $9.60[7]	$9 to $10.85	n/a[4]	$12.50
Hourly nonprime-time fees[6]	$3.50	$4.80 to $9.60[7]	$0 to $1.85	n/a[4]	$3
Front-end software					
Required	●	○	○	○	○
Available	●	●	○	●	●
Media online[8]					
Newspapers	4	uncountable	uncountable	500	64
Magazines	35 or more	uncountable	uncountable	600	538
Newsletters	uncountable	uncountable	uncountable	550	875
Government publications	uncountable	uncountable	uncountable	0	11
Press releases	●	●	●	●	●
News wires	10	5	4	12	9
Clipping service	○	●	●	●	○
Internet access					
E-mail	●	●	●	●[9]	●
Gopher	●[10]	○	●	○	○
Binary file transfer (FTP)	●[10]	○	●	○	○

[1] Includes 5 hours online.
[2] Includes unlimited access to some services.
[3] Rates are 10 hours at $10 or 20 hours at $20, plus $3 per month (at press time) for Internet access.
[4] Fees are based on the amount and type of information retrieved.
[5] Includes 4 hours of access to limited services.
[6] For time beyond what is covered in monthly rate.
[7] Rates based on modem speed.
[8] Estimated number at press time.
[9] Through MCI Mail at an additional cost.
[10] Not available at press time.

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Saves you money: *no need to buy various utilities to improve Windows performance.*

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FEARLESS FLYER: Author James Martin takes off with wireless mobile computing.

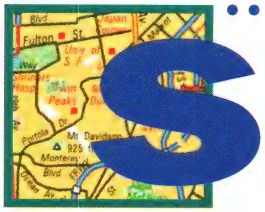
The WIRELESS

PHOTOGRAPH BY JOCK McDONALD

OUR **FEARLESS** ROAD WARRIOR RECOUNTS THE TRAVAILS OF HIS FOUR-CITY, **CROSS-COUNTRY** JOURNEY, ARMED WITH **A NOTEBOOK,** A PALMTOP, AND A SUITCASE BRIMMING WITH WIRELESS **GIZMOS.**

BY JAMES A. MARTIN

WANDERER



She's in a taxi on her way to the airport, but that doesn't stop the young manager with a notebook from firing off E-mail missives.

He's reclining languidly on a beach, a mai tai in one hand, a personal digital assistant in the other. At the push of a button, the executive faxes a report to the office, and his work is done.

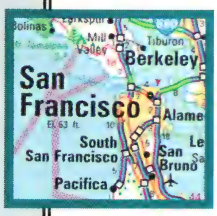
Just another day in the world of wireless computing? It is if you believe the blissful visions promoted by advertisers of wireless software and hardware. According to them, with the right equipment, you too can join the ranks of the wireless road warriors, those on-top-of-it-all gods and goddesses with the ability to recapture lost time, prevent information bottlenecks, and never leave the office—even when they've left the office.

But how realistic is the wireless promise? Can you actually send and receive E-mail from practically any place in the United States, without plugging into a telephone jack? How easy to use is all this wireless stuff? How do the costs of wireless transmissions compare to land-line connections? What are the trade-offs? And, most important, is it possible to meet a deadline while working on your tan line?

To find out, I embarked on a four-city, cross-country, business/pleasure trip, laden with an IBM ThinkPad 750C notebook, a Hewlett-Packard 100LX palmtop, and a suitcase bulging with wireless equipment and paraphernalia. My main

mission was to transmit E-mail messages wirelessly, each with a different file attachment (a word processing document, a spreadsheet, a bit-mapped graphics file, a Rolodex file, and a presentation), from each of my destinations (San Diego; Boston; Greensboro, North Carolina; and Chicago).

My goal was to use a product from each one of the current wireless communications technologies: one-way radio paging, two-way packet radio, and circuit-switched cellular.



For additional cutting-edge drama, I planned to fly on Southwest Airlines and send E-mail and faxes from its newly installed digital phones.

Did my experiences transform me into a wireless road warrior? Let's just say that I had some successes, but for the most part I became a wireless road *worrier*.

AirOne charges $2 for each connection, plus $2 per minute. I racked up $90 in phone charges (almost as much as my $120 round-trip airfare) for a total of 32 minutes of connection time. That's $2.81 per minute, compared to the average charge of 24 to 27 cents per minute for cross-country phone calls made during peak time.

And then there's the inherent inconvenience of using a notebook from a crowded coach seat. Throughout the capacity flight, there was a heavy traffic pattern of peanuts and soft drinks constantly crisscrossing my virtual desktop. Meanwhile, an apparently overcaffeinated three-year-old behind me became fond of peering over my shoulder and punctuating her voyeurism with shrill screams.

Sunning in San Diego

My destination in San Diego was the Hotel del Coronado, a rambling Victorian seaside resort across San Diego Bay in Coronado.

> "THE **ONLY PLACE** I WAS ABLE TO MAKE A CELLULAR CONNECTION WAS, **UNFORTUNATELY,** BY THE POOL."

Setting Up in San Francisco

Before I could begin my mobile meanderings, a certain amount of setup was required to connect the Intel Wireless Modem to the RAM Mobile Data Network. To communicate with a LAN-based E-mail system, you need two Intel modems: one for the notebook, and the other to act as a receiving device on an E-mail router. Norman Noble, *PC World*'s information systems manager, installed the Intel transceiver modem on one of the magazine's dedicated E-mail routers, as Intel's literature instructed. Before long, Noble was convinced this setup wouldn't work.

"It's a bit misleading to say that you can just attach this modem to any E-mail router," Noble said. "Our router is busy going round-robin, checking for messages with six or seven other E-mail systems. The only way remote users can get into the router in this situation is if they happen to call in at a time when it's not busy."

Noble was right. In my preliminary tests using Intel's Wireless Modem and Lotus cc:Mail Mobile 2.0 for Windows, I was unable to connect to *PC World*'s cc:Mail post office on nearly three out of four tries. Noble solved the problem by setting up an old 16-MHz 386 as a dedicated E-mail router for my testing.

The Ultimate in Air Mail

With that problem solved, I boarded a Southwest Airlines flight bound for San Diego. On board, I used the AirOne digital phone, developed by Claircom Communications Corporation, to send several two- and three-page faxes. (The quality of the resultant faxes was consistently good.) AirOne was, for the most part, easy to use: Prepare the notebook and software for communicating, release the phone from its cradle, insert a phone cord into the handset's RJ-11 jack, push the data button on the phone, wait for the green light and double beep, run your credit card through the magnetic reader, and you've got a connection.

Despite the usability and convenience, airplane telecommuting has some considerable drawbacks. Chief among them is cost:

Listed on the National Register of Historic Places, the "Hotel del," as it's affectionately called, was built in 1888 by a railroad magnate. The installation of its then state-of-the-art lighting system was reportedly supervised by Thomas Edison, the godfather—of sorts—of wireless messaging.

With its history, the Hotel del seemed an appropriate spot for some wireless messaging trials. Inspired by the aforementioned cocktail-swilling beach-bound exec, I ensconced myself beside the pool with my notebook and a mai tai. But I soon encountered a major roadblock: The ThinkPad 750C's active-matrix color LCD screen was completely unreadable outdoors—even in the shade.

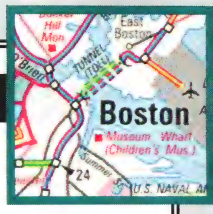
Forced to move inside, I found a conference room and was able to obtain a strong enough radio signal to transmit messages on the Intel Wireless Modem. Transmission times were slow: A 6K text file took just over 1 minute to send, while a PCX image required more than 4 minutes. (See "Wireless vs. Wired: The Bottom Line" for more information on transmission speeds.) Ready to try out some faster circuit-switched cellular technology, I connected a Motorola MicroTac Ultra Lite cellular phone to a Motorola Cellect Pocket Faxmodem, which I then connected to the ThinkPad. My effort was rewarded with a fast busy signal; I could not gain access to cellular services. I tried again, to no avail, from my room and from the Hotel del's Palm Court lounge. The only place I was able to make a cellular connection was, unfortunately, by the pool.

A customer service representative at AirTouch Cellular, a major San Diego service provider, explained that cellular service to Coronado is spotty at best due to interference from cellular sites in the Los Angeles basin and Mexico.

Bewildered in Boston

I returned from San Diego long enough to unpack and repack, and I was off to Boston a day later to attend the Seybold Seminar—a conference/expo for electronic publishers held at the John B. Hynes Convention Center downtown.

On my first day at Seybold, I attempted some wireless messaging



from the show floor. I was unable to make a connection from the bowels of the convention center and relocated to a table next to floor-to-ceiling windows on the third floor.

From this vantage point, I had a marvelous view of Boylston Street and the lines of conventioneers waiting to use the pay phones inside. I set up my wireless commando station and successfully transmitted four of my five E-mail attachments (spreadsheet, graphics, word processing, and Rolodex files) via the Intel Wireless Modem.

The presentation file, my fifth attachment, was a whopping 9.2MB. About 50 minutes into the transmission, the batteries in the ThinkPad and the wireless modem were nearly depleted. The transmission seemed to be only half done, so I called it a day.

I had less than 1 hour to transmit files from the convention center the next day, so I sent the presentation file that night from my room using AC adapters for the ThinkPad and the Intel modem.

EASY BURN: Martin finds going wireless has fringe benefits, but it's not always practical.

Chugging along at a top speed of 2400 bits per second (bps), the total transmission time was 1 hour, 36 minutes, 21 seconds. Subsequent attempts, relying completely on battery power, yielded similar results—the longest transmission was 1 hour, 45 minutes. Each transmission drained fully charged batteries in both the ThinkPad (using its optimal processor performance level) and the modem. Aspiring road warriors, take note: You're only as good as your battery charge.

The next day I returned to my convention center perch to give the Motorola cellular modem and phone a try. So far, I had been unable to connect to the *PC World* post office using the Cellect modem, but I had attributed the problem mostly to the inconsistent signals at the Hotel del and on the airplane.

Despite the clear cellular signal I received in the convention center lounge, however, my efforts to connect were repeatedly thwarted by the same cc:Mail 'Modem Not Responding' error message.

Since I had successfully used FaxTalk Plus for Windows to fax documents from the ThinkPad using the Motorola cellular setup, my inability to hook into cc:Mail was bewildering. From my hotel room, I called Lotus's toll-free tech support number. After 30 minutes on hold, I opted to leave a voice-mail message, which was never returned.

In desperation, I enlisted the help of a Lotus public relations executive, who put me in touch with a tech support representative. We worked on the problem for several hours, but still I got the 'Modem Not Responding' message.

We finally had to face the ugly truth: cc:Mail did not provide the necessary AT commands and setup strings to enable it to work with the Cellect Pocket Faxmodem. A Lotus spokesperson later explained that the Motorola Cellect must not have been among the modems tested and certified before cc:Mail Mobile 2.0 for Windows shipped. Cellular modems are finicky and often don't work with standard Hayes-compatible modem files, he added.

As a result, I was unable to test the Cellect modem with cc:Mail Mobile for Windows throughout my travels. Upon my return to San Francisco, I sent the modem to a Lotus engineer, who wrote a Cellect Pocket Faxmodem driver and shipped it back to me the following day with the modem. For regular customers, this process takes two to three weeks—unless you luck out and find an appropriate driver on a Lotus bulletin board.

The driver did the trick, and I was at last able to send E-mail messages using the Cellect. It often took several tries before I got a clear cellular connection. And although the Cellect supports up to 14.4-kilobits-per-second (kbps) transmission speed on a land-line connection, it drops down to 7200 bps—and sometimes even lower—for cellular connections (the slower the speed, the lower the likelihood of transmission errors). Nonetheless, compared to the sluggish performance of the Intel Wireless Modem (somewhere between 1200 bps and 2400 bps), transmitting files with the Cellect felt practically liberating.

Back in Boston, as I packed to leave, I couldn't help but feel discouraged about not being able to send E-mail messages using the cellular connection. But a feeling of derring-do swept over me as I thought of the woman in the wireless ad, sending messages from the backseat of a taxi. And so, during my own white-knuckle taxi ride to Logan Airport, I took out the ThinkPad, hurriedly connected the Intel Wireless Modem, and dashed off an E-mail message.

It was a moment worth savoring.

PHOTOGRAPH BY GERRY GROPP

Acts of God in Greensboro

From Boston I was off to Greensboro, the North Carolina city where I grew up. On my first day home, I went to lunch with my sister Julia—a business tycoon with a pager strapped to her belt—her three kids, and my mother.

"I worry about you living in California," Julia said. "All those earthquakes…"

I offered my standard defense: "We have earthquakes; y'all have hurricanes and tornadoes." The next day, as if to dramatically illustrate my point, a series of tornadoes swept through the South. We had rain, hail, thunder, lightning, and a few uprooted trees.

I seized the opportunity—à la Benjamin Franklin—to discover if wireless messaging would still fly in the face of nature's wrath. I sent two faxes using the cellular setup without incident, but it took five tries to connect to cc:Mail using the Intel modem.

I repeatedly received an error message explaining that the 'Post Office Did Not Answer'. An Intel technician later explained that severe electrical disturbances can disrupt radio transmissions, causing the receiving E-mail post office to reject the incoming signals. My mother used to tell me not to use the phone during a thunderstorm, and she was gratified to know that you shouldn't try to transmit a spreadsheet during one, either.

Wireless 101: A Guide for Road Warrior Wannabes

BEFORE YOU CAN CHOOSE the best wireless method for you, it's important to understand how they differ. Currently, there are three methods: cellular, radio, and paging. Cellular also uses two alternative technologies—circuit switching and packet switching. The latter is used by radio as well.

Circuit switching is the technology behind current telephone systems. When you make a call, you establish a connection; for each connection, you receive a dedicated, two-way telephone line circuit.

Unlike circuit-switched communications, in which your voice and data flow continuously from connection to termination, packet-switched transmissions are like sending a letter, one page at a time, with each page mailed in its own envelope. In a packet-switching network, a computer file is broken into individual packets, each containing the necessary addressing information. Each packet is discrete and transmitted independently. In the event a packet is corrupted during transmission, it is automatically re-sent. Packets are reassembled in the proper order on the receiving end.

In general, packet radio technology is more cost-effective for short messages, while circuit-switching cellular technology is cheaper if you transmit lots of data. It's difficult to specify an exact point at which it's better to select one or the other because there are so many variables with each technology. In general, though, circuit-switched cellular services impose connection charges such as a per-day roaming charge when you leave your area code, charges for the cellular airtime you use, and the actual long-distance charges. You have to pay all those fees even when you make a quick connection (a couple of minutes, say). The longer your call, the more you amortize those connection charges over the duration of your call. With packet-switching technology, you pay only for the amount of data you send; there are no roaming charges, no additional airtime charges, and so forth. So a shorter call should cost less than a comparable cellular one.

CELLULAR

CIRCUIT-SWITCHED CELLULAR TRANSMISSION: In wireless cellular communications, a cellular phone is connected to a cellular modem, which in turn is linked to a notebook via a Data Terminal Equipment cable.

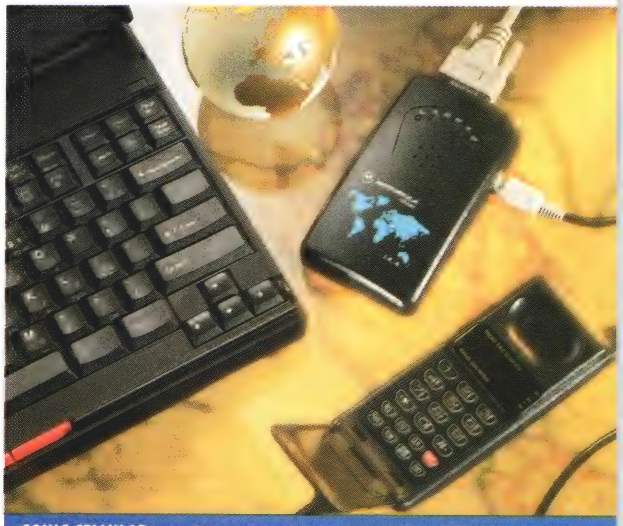
A cellular phone transmits signals to the nearest *cell*. (A cell is a radio transmitter/receiver.) From there the call travels to its destination along analog telephone lines. When a caller moves, the signal can momentarily weaken as it's handed off to the cell closest to the caller's new location.

PROS: You should be able to use a cellular modem as you would any modem. Because you pay by the minute and incur setup charges for each call, cellular modems can be more cost-effective when used to send large messages. They are also versatile, offering RJ-11 connections for traditional land-line links.

CONS: Cellular calls are prone to static and interference. Although many cellular modems offer speeds of up to 14.4 kbps, most cellular transmissions occur at a default speed of 7200 bps (the faster the speed, the greater the chance of transmission errors). Cellular signals are easily intercepted and make data security difficult to ensure. Cellular modems work only with a select group of cellular phones. For instance, one of the more versatile modems—the $299 Gold Series PCMCIA Cellular Fax-Modem from Megahertz Corporation—works only with NEC's P100 Series, Mitsubishi's 3500 and 4000SPK, and Diamondtel's 20 and 22 phones. Cellular modems and phones are expensive, and service charges are high. Most cellular phone batteries are good for only about 45 minutes to 1 hour of use.

CELLULAR DIGITAL PACKET DATA (CDPD): This two-way, digital packet-switching technology takes advantage of the existing voice cellular telephone infrastructure. With CDPD, a computer file is broken into packets, which are sent over cellular networks during the natural pauses that occur in voice conversations.

PROS: Transmissions are expected to be fast—19.2 kbps. Data is sent in packets, so CDPD communications should be more reliable—and secure—than circuit-switched cellular transmissions. CDPD should cost less than



GOING CELLULAR requires several devices: IBM's 750C note and Motorola's Cellect modem and MicroTac Ultra Lite cell phone.

In less turbulent moments, I had my first opportunity to experiment with the HP StarLink one-way wireless messaging service. With the HP palmtop and Motorola PCMCIA NewsCard, I was able to receive personal messages (through my StarLink account), as well as the latest international news and brief stock, sports, weather, and entertainment updates. (This service is available via NewsLink, an optional $5 monthly StarLink service.)

I found that whenever the radio signal was weak, messages contained numerous errors. A StarLink spokesperson said that to avoid receiving garbled messages while traveling, you can arrange to have personal messages held for up to 99 hours and transmitted at an appointed time. NewsLink messages can't be held, however, since they are transmitted simultaneously to all subscribers.

There are two ways to send a StarLink message: by calling a toll-free number and speaking to an operator, who then types and transmits a written message; or via a modem, a communications program, and a connection to PCLink (reached through a toll-free number). I sent messages to myself using both methods. On nearly every occasion, the StarLink operators transcribed my messages correctly. Even more impressive, the messages were transmitted to my NewsCard within

ON THE AIR: Intel's wireless radio modem provides a good, albeit slow, connection. It works with any notebook.

standard circuit-switched cellular or land-line modem transmissions, since you're billed by the packet. Also, CDPD combines voice and data capabilities in one device.

CONS: The technology is extremely complex, causing some to worry that it won't work as well as promised. CDPD providers won't have an easy time getting cellular service providers, application software developers, and device manufacturers to work together for seamless operation. And the service is still not widely available. At press time, a McCaw Cellular Communications spokesperson said the company plans to have 105 major U.S. metropolitan areas online with at least limited commercial CDPD services by year's end. GTE Mobilnet plans to roll out commercial CDPD services in San Francisco by August and in Houston by September.

RADIO

Packet radio is a communications method that transmits packets of data over a network via radio signals. The RAM Mobile Data Network, for example, divides metropolitan areas into cells. Within each cell is a base station—a radio tower capable of sending and receiving data packets from your notebook. The base station receives and routes E-mail to other mobile users, or dispatches it to the local switch. The message travels from the switch to a regional or national switch, then to a base station near the receiving radio modem. From that base station, the packets are transmitted to the receiving modem.

PROS: Radio frequencies are less susceptible to interference and noise than cellular signals. Transmission costs are based on data packets, not transmission time—a plus when sending messages with small E-mail attachments. And there are no roaming charges. Transmissions are digitally encoded, for greater security than cellular communications offer.

CONS: Packet radio communications are slow. Because all users share bandwidth over a particular network, throughput is often less than 2400 bps. You can use radio modems only with electronic-mail applications; there is no fax capability. In addition, radio modems are expensive and rather bulky; for instance, Ericsson GE Mobile Communications' Mobidem, which is also sold as the Intel Wireless Modem, is approximately the size of a brick. Batteries are good for 2 hours of use and can take up to 12 hours to recharge.

PAGING

Paging is a one-way, wide area, wireless communications method in which brief alphanumeric messages are transmitted using radio frequencies to an electronic pager. Pagers, now available as PCMCIA devices, download the messages to a notebook or palmtop computer for display.

PROS: Pagers are lightweight. For instance, the Hewlett-Packard 100LX palmtop with the Motorola PCMCIA NewsCard weighs about 1 pound. Callers dial a toll-free number, available 24 hours a day, and relay messages to an operator, who transcribes and transmits them; PC users can send messages via modem. Messages are transmitted quickly—often in less than 1 minute. You can also receive news, sports, weather, and stock information at scheduled intervals.

CONS: You can't send messages. PCMCIA pagers are more than twice the cost of simple pagers. Messages transmitted when radio signals are weak frequently contain errors.

ONE-POUND WONDERS: The PCMCIA NewsCard from Motorola in action with Hewlett-Packard's 100LX.

PHOTOGRAPHS BY ROBERT PERRY

1 minute. Sending messages over a modem to PCLink is easy. It took about 7 minutes, however, for each uploaded message to reach my NewsCard.

Chilled in Chicago

Leaving Greensboro's newly blooming dogwood trees behind, I arrived in Chicago at the tail end of a relentless winter. "Set another record in February," a cab driver informed me. "Twenty-five inches of snow."

After checking into the Drake Hotel, a glorious old-world establishment where a harpist performs every afternoon at high tea, I was off to the Sears Tower to perform my own act—without wires.

The Sears Tower is the world's tallest office building; as such, it was an irresistible venue for attempting some wireless messaging. After the ear-popping elevator ride to the top (103 floors up), I surveyed the spectacular view.

I set up my electronic gear on a bench, was immediately eyeballed by everyone in the room, and went about my tasks. My transmissions over the Intel wireless went splendidly; the radio signal was strong, and each file attachment transmitted about 10 to 20 seconds faster than anywhere else. I also fired off some faxes without a hitch.

Conclusion: It's Still Up in the Air

"A wireless world," according to a Motorola marketing brochure, "will be a tremendous step forward, and with commitment, cooperation, and collaboration, it will become a reality." Maybe, but given my experiences, I'm not sure exactly when the reality will begin.

You can, of course, run out and become a wireless road warrior right this minute. Just be prepared to pay the frequently higher costs involved with wireless messaging. Spending $795 on a modem capable only of sending E-mail messages and only at speeds of 2400 bps or less, and that also requires a dedicated E-mail router, isn't my idea of a bargain. You'll also have to lug around spare batteries, battery rechargers, and manuals along with your laptop and its own required paraphernalia. And be ready for failure if a radio or cellular signal isn't strong enough to transmit your message. You have to struggle through all this, just for the thrill of sending a message from places you couldn't have before.

On the plane home, I felt discouraged. Taking stock, it seemed my wireless misadventures had decidedly outweighed my successes. To get my mind off the subject, I picked up the *New York Times* and discovered an article on an agreement between McCaw Cellular Communications and Microsoft to launch a corps of communications satellites by the year 2001. The satellites will enable us to inexpensively and easily make phone calls and send enormous amounts of data practically anywhere in the world.

The article reminded me of a curious billboard I saw in Boston that displayed a single quotation from Thomas Edison: "We do not know one-millionth of one percent." Suddenly it was all clear: We're at the very beginning of this wireless world, and while I may have become painfully familiar with some of its current limitations, no one really knows the extent of its possibilities. Yet.

James A. Martin is editor of Macworld'*s Graphics section. His travel writing has appeared in* Travel & Leisure *and the* New York Times.

Wireless vs. Wired: The Bottom Line

	WIRELESS PACKET RADIO TRANSMISSION	WIRELESS CIRCUIT-SWITCHED CELLULAR TRANSMISSION	WIRED CIRCUIT-SWITCHED LAND-LINE TRANSMISSION
PRODUCT	Intel Wireless Modem (using RAM Mobile Data Network) [1]	Motorola Cellect Pocket Faxmodem [2]	Motorola Cellect Pocket Faxmodem [3]
TOP DATA TRANSMISSION RATE (BPS)	9600	14,400	14,400
ACTUAL THROUGHPUT (BPS)	1200 to 2400	7200	14,400
MODEM LIST PRICE	$795	$399 [4]	$399 [4]
OTHER HARDWARE COSTS	$795 for LAN transceiver	$950 for Motorola MicroTac Ultra Lite cellular phone [5]	n/a
TOTAL HARDWARE COSTS	$795 individual, $1590 LAN	$1349	$399
AVERAGE TRANSMISSION TIME/ ESTIMATED COST USING THE FOLLOWING FILE FORMATS AND SIZES [6]			
DYN (Rolodex)/3K	1:10/$.60	0:26/$1.35	0:20/$.24
PCX (bit-mapped graphic)/30K	4:08/$6	1:10/$2.50	0:32/$.24
PRE (presentation)/9.2MB	101:50/$20.30	23:00/$28	12:02/$3.25
TXT (text)/5K	1:18/$1	0:33/$1.35	0:20/$.24
XLS (spreadsheet)/3.5K	1:08/$.70	0:29/$1.35	0:16/$.24

n/a = not applicable

[1] RAM Mobile Data Network's Mobile Professional Plan ($75) includes up to 400K of messages per month; additional messages are $.20 per 1K. Estimated costs are based on the assumption that this allotment had already been exceeded before transmissions.

[2] Transmission costs vary widely depending on carrier, time of day, distance of call, and other factors. Charges here include airtime and long-distance fees and are estimates based on cross-country, weekday usage.

[3] Transmission costs are estimates based on MCI long-distance fees for cross-country calls made during weekday hours.

[4] A PCMCIA version of this modem costs $549.

[5] Estimated street price.

[6] Times, in minutes and seconds, are from the moment a connection was established to the moment a transmission was verified as sent; transmission costs are estimates only.

Moving Targets: A Guide to Wireless Communications

THE PROMISE OF WIRELESS communications is alluring: instant communications via your notebook from anywhere at any time. The reality, however, is less engaging. To perform wireless feats, you need the right equipment, the right location, accounts on the right services, money, and patience. But it can be done.

This buyers' guide concentrates on products designed to receive and/or send data wirelessly using special modems and other equipment. The products use the national cellular network, special private data networks, satellite services, or a combination of these technologies.

MAKING CHOICES: While most products are designed to provide wireless communications for today's notebooks, a new breed of lightweight computing devices, dubbed *personal communicators* and designed primarily as wireless communicators, is emerging.

Meanwhile, the Cellular Digital Packet Data (CDPD) specification is about to reach the market, with nationwide introduction expected by the end of the year.

For now, paging offers the most reliable, cost-effective, and ubiquitous solution to wireless communications needs. But new technologies are evolving at a rapid rate.

—Stan Miastkowski is a freelance writer based in Peterborough, New Hampshire.

SERVICES

Company	Product	Description	Pricing	Reader service no.
AMERITECH 800/662-4531	Wireless Packet Data Service	CDPD cellular services in development	Not available at press time	–
ARDIS 800/992-7347 ext. 4485	PersonalMessaging	Packet radio network covering 10,700 U.S. cities	$69/mo. for 200 messages, 29 cents each additional message	761
GTE PERSONAL COMMUNICATIONS SERVICES 404/391-8000	Unnamed	CDPD cellular services in development	Not available at press time	–
HEWLETT-PACKARD 800/917-5465	StarLink	Satellite-based, receive-only wireless messaging service for HP 100LX palmtop	50 messages/mo.: Local $19.95, regional $36.95, national $62.95	763
McCAW CELLULAR COMMUNICATIONS, INC. 206/827-4500	AirData	Standard cellular and (in development) CDPD services	Contact company for pricing information	764
MOBILECOMM 800/685-5555	MobileComm	Receive-only paging services in 50 U.S. cities	Contact company for pricing information	765
MOTOROLA 800/362-2724	Embarc	Satellite-based, receive-only wireless messaging service for PDAs and portable computers	$25 activation fee, $18/mo. plus messaging; average $60 to $70/mo.	766
RADIOMAIL 800/597-6245	RadioMail	Two-way wireless messaging via Internet, Ardis, and RAM Mobile Data Network	$89/mo.	767
RAM MOBILE DATA 800/726-3210	RAM Mobile Data Network	Packet radio network covering 6300 U.S. cities	Three-tiered pricing starts at $25/mo. plus 25 cents per kilobyte	768
SKYTEL CORP. 202/408-7444	SkyTel	Satellite-based, receive-only messaging for pagers and Motorola NewsCards	National alphanumeric $69/mo., national numeric-only $39/mo.	769

HARDWARE

Company	Product	Description	Pricing	
AIR COMMUNICATIONS 800/247-3282	AirCommunicator	Integrated cellular phone/fax-modem with Windows	$1595	770
AT&T PARADYNE 813/530-2000	KeepInTouch Modem	PCMCIA cellular modem; connects directly to Nokia cellular phones	Not available at press time	771
DATA RACE 800/329-7223	RediCard	PCMCIA V.32terbo (19.2-kbps) fax/data modem	$399, RediCell adapter cable for cellular phones (required) $129	772
INTEL CORP. 800/538-3373	Intel Wireless Modem	Wireless modem for RAM Mobile Data Network	$795	773
MEGAHERTZ CORP. 800/527-8677	Gold Series PCMCIA Cellular Fax Modem	19.2-kbps modem with MNP-10; compatible with NEC P100 Series, Mitsubishi 3500 and 4000SPK, and Diamondtel 20 and 22 phones	$299	774
MICROCOM 800/822-8224	TravelPorte Fast	28.8-kbps portable fax-modem with MNP-10	$499	775
MOTOROLA, INC. 407/364-2000	PCMCIA NewsCard for PDAs	Receiver for Embarc messaging service	$249	776
MOTOROLA UDS 800/631-4869	Cellect Pocket Faxmodem	Cellular modem for direct connection to Motorola cellular phones	Portable $399, PCMCIA $549	777
NOVALINK TECHNOLOGIES 800/668-2546	NovaPak 144/32 NovaPak 144/128	Fax/data modem with wireless paging receive services	$449 (144/32) $499 (144/128)	778
SOCKET COMMUNICATIONS 800/552-3300	PageCard	PCMCIA pager receiver	$495	779
U.S. ROBOTICS 800/342-5877	WorldPort Dual Standard	Portable modem with HST cellular protocol modem	Portable $545, PCMCIA $595	780
ZYXEL 800/255-4101	U-1496P	Portable data/fax/cellular modem	$529	781

Compact and lightweight — at just 4.4 lbs. The Portégé Series has been engineered to the extremes of portability without compromising usability.

DEFY THE LAWS OF SPACE AND TIME.

The new AccuPoint™ isometric pointing device works in conjunction with click and drag buttons located comfortably beneath the thumbs.

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Toshiba discovers the secret to longer life: The ultra-lightweight Li-Ion battery, with up to 6 hours of battery life, is the ultimate in power-per-ounce.

Generous 8.4" and 7.8" active matrix displays (on the T3600CT and T3400CT, respectively) deliver 256 SVGA colors.

intel inside

Portégé T3600CT
- 50MHz i486™DX2
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- 8MB RAM (expandable to 24MB)

Portégé T3400CT
- 33MHz SL Enhanced i486™SX
- 7.8" dia. color TFT-LCD active matrix display—256 color SVGA
- 4MB RAM (expandable to 20MB)

Both Models
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- Lithium-Ion battery
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- Integrated BitBLT graphics accelerator
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Circle 228 on reader service card

Here's How

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HELP LINE Q & A

Tip of the Month

TECH SUPPORT NAG: If you've connected your phone to a modem, you can automatically redial phone calls to busy tech support lines (or radio stations to win call-in contests). It doesn't matter what communications software you have.

Start by enabling your communications program's auto-redial feature. Set the maximum number of redial attempts to 100 or more, and set the pause between calls to 2 seconds—just enough to get the dial tone back between calls. Also, set the wait for connection time to 10 seconds or less, again to speed up dialing.

Next, tell the modem to keep the speaker on while dialing and to use its highest volume: Find the modem's initialization string in your communications software's setup screen (it's the longest string that begins with AT), and before the ^M type in M2L3 or the commands your modem manual says control the speaker. To make the modem dial as fast as possible, add S11=50 to the initialization string.

Now add the phone number to your software's dialing directory, and you're set. Monitor the progress of your calls by listening in on the phone or the speaker. As soon as a voice answers, press <Esc> to silence the modem and stop the redialing.

Judy Heim, Contributing Editor

Deleting DoubleSpace

Q I got a larger hard disk and decided to stop using DoubleSpace. Microsoft's tech support helped me delete the compressed volume file, but I still see DoubleSpace files in my root directory and find DBLSPACE loads into memory when I boot up. I tried to remark out the line relating to DoubleSpace in CONFIG.SYS, but the program still uses memory. How can I prevent it from loading?

CraigL9999, America Online

A You must still be using DOS 6.0, which doesn't provide an easy way to un-DoubleSpace disks. DOS 6.2 provides a fairly elegant fix to get rid of the hidden DoubleSpace system files that still load into memory. But DOS 6.2, or the 6.2 Step-Up upgrade, may no longer be available by the time you read this. Stac Electronics won its patent infringement lawsuit against Microsoft, preventing that company from shipping any more copies of DOS 6.0 and 6.2 that include DoubleSpace.

You indicate that you've removed the compressed volume file, which means you must already have backed up the files it contained, or transferred them to an uncompressed drive. You must also have removed the system, hidden, and read-only attributes from the compressed volume file (DBLSPACE.00*x*, where *x* is a numeral) so that you could delete it.

To eliminate DoubleSpace completely, here's what you will need to do. Change to the host drive (the one from which you deleted DBLSPACE.00*x*; if you've forgotten which drive is the host, run **DBLSPACE** and select *Drive•Info*). Remove the system, hidden, and read-only attributes from DBLSPACE.INI and DBLSPACE.BIN (using **ATTRIB -S -H -R DBLSPACE.***). Issue **DIR DBLSPACE.*** to verify that no more compressed volume files (which may contain data you want to keep) exist. Delete the DoubleSpace files using **DEL DBLSPACE.***.

Call Time

Q My company recently replaced its file server's 33-MHz 386 system board with a 66-MHz 486 board. Everything works great, with one exception: The system's clock gains nearly 15 minutes a day. This may not be a critical problem for most users, but it is for us, because our Novell network implements log-in time restrictions and security lockouts during certain periods. Because of the clock malfunction, many people are unable to log in after hours, or are told that their permitted time online is much shorter than it should be. Is there some way to slow down the system clock, or will I have to keep correcting the time on a regular basis?

Davinder Singh, Corona, New York

A PCs are not meant to be precision timekeepers, but a loss of 15 minutes per day is more than you ought to put up with. You should contact the system board's manufacturer right away to make sure neither the board nor your installation are faulty.

Even if you find the source of such grossly inaccurate timekeeping, it's still unlikely that your PC will keep perfect time. But instead of resetting the clock manually, try using one of several utilities that automatically put it back on track. PCCLOCK is a cool, $20 DOS shareware program that displays the

JAMES KACZMAN

date and time in a big, flashing, digital display—something most of us will enjoy for about 2 minutes before deleting the program. Fortunately, it can also automatically dial the atomic clocks at either the National Institute of Standards and Technology (NIST) in Boulder, Colorado, or the U.S. Naval Observatory (USNO) in Washington, D.C. PCCLOCK then resets your computer's clock to the official time. You can find the program on PC World Online as PCK300.ZIP.

Professional Timeset is a more advanced, $40 shareware utility that synchronizes your computer with both of the U.S. atomic clocks and three European time sources. As with PCCLOCK, you can add Timeset to your AUTOEXEC.BAT and it will synchronize your clock at every boot. Timeset also works in conjunction with another $40 shareware program, RighTime, to keep your system clock as accurate as possible. RighTime is a TSR that keeps track of corrections you make to the clock, through either DOS's TIME command or Timeset, and saves the data in a file or in unused areas of your CMOS chip. Armed with this time-correction history, the program calculates the actual drift rate in the hardware clock and adjusts the time every 4 seconds. Assuming your clock's drift is constant (if it's not, you definitely need a replacement), RighTime reduces clock drift to as little as half a second a week, according to the program's creator. You can find both Professional Timeset and RighTime on PC World Online as TSET721.ZIP and RITM254.ZIP, respectively.

Finally, even if your Novell server knows what time it is, that doesn't mean your workstations do. NovSync is an inexpensive device driver ($50 for unlimited servers) that keeps workstation clocks synchronized with the server clock. You can find the utility on PC World Online as NOVSYNC.ZIP.

By combining NovSync with Timeset and RighTime, you should be able to keep your entire LAN humming along in perfect clockstep, while minimizing the need for long-distance calls to NIST or USNO.

Cardfile A-Go-Go

Q I use my Windows Cardfile accessory to store telephone numbers and addresses. I travel a lot and always keep a printed set of the information with me. But my only hard copy options are to print one index card per single sheet of paper, or print the whole file, three cards per page, on a ton of paper.

The time has come for me to start using some sort of database to manage this information better and print it out in a more condensed form. Is there any way to convert Cardfile's binary CRD data files to a usable format? If not, I am in for many hours of retyping.

Terry Pownall, Internet

A The beauty of Cardfile, and also its weakest point, is that it's almost completely free-form—it allows you to enter as much text as will fit on a card, and to search for cards using the separate index lines at the top of each card or using text in the cards' contents. The trouble comes when you want to get data out of Cardfile: Your only option is to print out each entire card, blank lines and all. You can squeeze four cards onto a page if you reduce the top and bottom margins (in the program's File•Page Setup dialog box), but this is still a tremendous waste of paper. And of course Cardfile offers no way to print labels or mailing lists, to export text, or to copy and paste more than one card at a time. Fortunately, several free—or nearly free—utilities let you translate Cardfile data to ASCII text, and vice versa. This can be helpful when you need to graduate to a real database or you want to generate hard copy without depleting an entire national forest.

If you're lucky, your Cardfile database already follows some conventions so the output file isn't a complete jumble. Conversion utilities place the index line and each line of card contents (ending with a carriage return and linefeed) into

USER GROUP OF THE MONTH

Idaho PC Users Group

August's user group tips come from the Idaho PC Users Group. This all-volunteer group meets at 7:30 p.m. on the second Thursday of each month at the Boise State University College of Technology Building, 1375 University Avenue, Room 110, in Boise. Members receive *Bits & Pieces*, a 20-page monthly newsletter featuring reviews, product discounts, and a help section. A BBS offers information about the group and more than 1GB of shareware and public-domain software. Special interest groups include one for Paradox and Quattro.

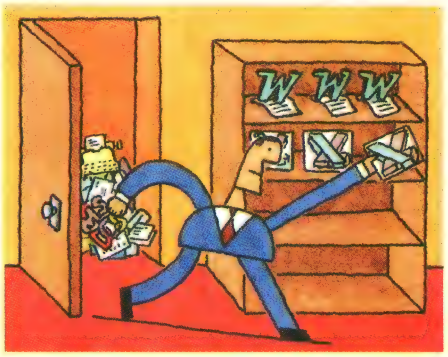
For more information, contact Clint Tinsley, president, at P.O. Box 9136, Boise, ID 83707, or call 208/888-0091. Dial the BBS at 208/376-0426. Membership costs $25 a year.

Reader service no. 602

AN ICON FOR EVERY DIRECTORY: I often keep Windows programs' data files in different directories. Unfortunately, a program such as Excel can't predict the data directory I want it to default to. But I still get my way—I create a separate program icon for each data directory and assign each its own default directory.

In Program Manager, hold down <Ctrl> and drag a program icon to a new location. Select the new icon, press <Alt>-<Enter>, and type a new description. In the Working Directory text box, type the path of the directory you want to assign to this icon and click OK. Run the program and ensure it has no default data directory setting of its own. When you double-click the icon and select File • Open, the program will use the directory you assigned to the icon.

Tim Wolf
Idaho PC Users Group



separate fields. It helps if the fields you extract from each card are generally the same—for example, a person's name in the index line, followed by the company name, address, and phone and fax numbers on separate lines in the main card area. If a few cards don't quite match the template, just open the converted data file in Excel or another program that lets you rearrange and parse cell contents easily.

CardExport, a simple public-domain utility, converts Cardfile data to comma- or tab-delimited fields, and gives you some control over how much of the original card gets included in the output file. CardExport can't convert long index lines, but it works if you shorten them to about 25 characters or less. It's on PC World Online as CARDEXP.ZIP. (It requires VBRUN300.DLL, also available on PC World Online, to run.)

The Windows Cardfile Conversions program doesn't give you any control over the output file—it converts data to tab-delimited fields only. It does let you convert ASCII text into Cardfile data, though. The program is only in a beta version, but commercial and corporate users still must get a license from the author. Find Cardfile Conversions on PC World Online as CARDXL.ZIP.

WINCRD is a simple, free DOS program that translates text and Windows Cardfile files in either direction. It comes with the Turbo Pascal source code, which the author says you are free to modify. You can find it on PC World Online as WINCRD.ZIP.

Tone Down Costs

Q I'm a computer instructor in a small, rural public school, and recently purchased an IBM Lexmark 4037 5E laser printer. It is our first laser printer purchase, and I was shocked to find out that toner cartridges cost between $87 and $114. When I heard this I nearly fell out of my chair. I knew toner wasn't cheap, but come on!

Can you tell me where to look for recycled cartridges for my printer? Our school administrator will have a stroke if we pay this much for printer supplies.

Shannay Witte,
New England, North Dakota

A Actually, the cost per page using toner is much less than the cost per page using ink ribbons—so your administrator is paying less in the long run for printer supplies. However, you're right about recycled cartridges. They're the only way to go, for a number of reasons: They're a lot cheaper (often less than half the cost of a new one), they last longer (because most recyclers fill them with more toner than the original manufacturers did), and they help save the environment (recyclers don't throw a cartridge away until it's actually damaged or worn out).

If you can find one, a local dealer in recycled toner cartridges may be your best bet. Many not only pick up and deliver cartridges in person, but also install the new ones for you and make sure everything inside your laser printer is shipshape. If you can't find a local company, call one of the national dealers listed below. In addition to cartridge price, check dealers' exchange and shipping policies: Some companies pay for shipping and allow you to send in the empty cartridge for credit after you've received the replacement. Many of them also refill ink jet cartridges and reink impact printer ribbons.

If, as in your case, the printer is a fairly new model, you may have a hard time finding recycled cartridges. One reason is that volume is still too low to attract dealer interest. Another is that many recyclers say it's difficult to find out exactly what kind of toner to refill cartridges with (a spec not always forthcoming from the manufacturer). In fact, none of the companies listed below currently recycles the 4037 5E's cartridges, although most do deal in cartridges for other IBM printers, such as the 4019 and 4029. My recommendation is to buy the $87 toner cartridge for now, and hang on to the empties. If the 4037 5E catches on, recycled cartridges for it may be available by the end of the year, and you'll be able to send your empties off to a recycler that offers a good price.

- **Advantage Laser Products;** 800/239-4027
  Reader service no. 603
- **Coastal Laser Products;** 800/432-1628
  Reader service no. 604
- **Discount Laser Supply;** 800/786-2270
  Reader service no. 605
- **Laser Quipt;** 800/777-8444
  Reader service no. 606
- **L.C. Products;** 800/817-3758
  Reader service no. 607
- **National Toner Recycling and Supply;** 800/676-0749
  Reader service no. 608
- **Willow;** 800/426-8196
  Reader service no. 609

Stealthy but Slow

Q I purchased Quarterdeck's QEMM 7.0 memory manager and installed its Stealth DoubleSpace feature, which moves DOS's DoubleSpace driver out of conventional memory and maps it into an expanded memory page frame whenever it is needed. This procedure saves a lot of memory—about 40K—but dramatically slows down my system. When I disable the feature, performance returns to normal. Is this what should be happening?

Bruce E. Farmer,
Eielson Air Force Base, Alaska

A When a computer takes on the added task of reading data from extended memory into an expanded memory page frame every time it accesses a DoubleSpaced drive, it clearly slows performance. If you also use QEMM's Stealth ROM feature, things may get even slower. If you find this performance hit unacceptable, try tweaking QEMM and Stealth DoubleSpace command-line parameters (see "Improving Disk Performance When Using Stealth DoubleSpace" in chapter 5 of the QEMM manual). Better yet, try doing without Stealth altogether. QEMM is great at freeing up memory, but few of us need the 630K-plus it serves up. Even if you have a fully loaded multimedia system, you should be able to free at least 600K without Stealth—plenty of RAM for most DOS or Windows business applications, and for all but the greediest of games.

By Scott Spanbauer

Scott Spanbauer is a PC World *contributing editor.* Help Line *welcomes your questions (see page 12 for contact information).*

FREE*

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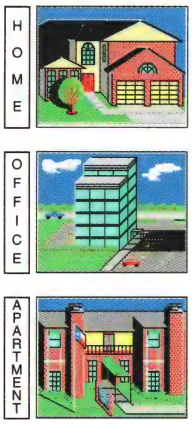
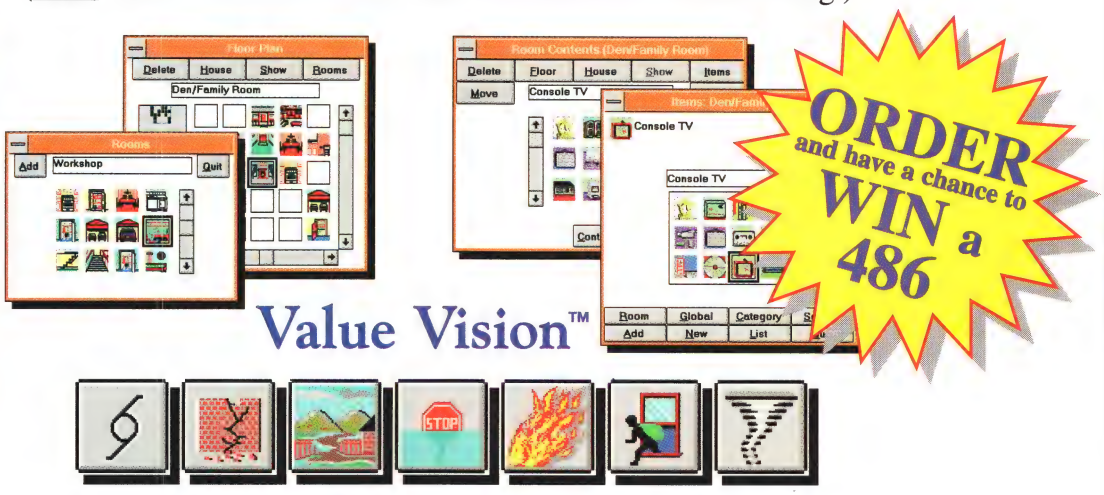
Personal Inventory Manager™

The response to our offer has been overwhelming. Many of you have had difficulty obtaining a copy, so we are extending our offer. We would like to say thank you by giving away a 486 computer each month this offer remains in effect, to someone who has ordered Value Vision. (**ALL** orders received to date have been entered in the drawing.)





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Armed only with a mouse and Fusion Software's **Value Vision**, you can capture the contents of your home or office, and it's quick, easy, and fun. Now you can have the peace of mind you've always wanted, knowing that you are properly insured. And filing an insurance claim with **Value Vision** is as easy as clicking a mouse button.

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486

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P8

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fusion Software

Circle 111 on reader service card

SPREADSHEETS Q & A

Rounding Time Intervals in Any Spreadsheet

Q I'm an airline pilot and must use a special system for tracking my expenses. The day is divided into 4 quarters, and I get credit for any portion of a quarter in which I travel. For example, if I depart on April 3 at 7:15 a.m. and return on April 5 at 7:15 p.m., I get credit for 11 quarters. Can you suggest a spreadsheet formula to calculate quarters, given a start time and an end time?
David Groves, Colleyville, Texas

A Sure. Today's spreadsheet functions give you a lot of latitude in how you can round values. In Excel 4.0 and 5.0, if your departure date and time are in A1 and your return date and time are in A2, the formula would be **=(CEILING(A2, 0.25)–FLOOR(A1,0.25))*4**.

In this formula, the CEILING function rounds its first argument (A2) up to the nearest multiple of its second argument (.25); similarly, FLOOR rounds down. Since dates and times are denominated in days, multiplying by 4 converts to quarters.

In Quattro Pro 5.0 for Windows, the formatting system encourages you to put the date and time in separate cells (remember to press **<Ctrl>-<Shift>-D** for each cell before entering date and time values). Thus, with the date in column A and the time in column B, the formula is **(@CEILING((A2+B2),0.25)–@FLOOR((A1+B1),0.25))*4**.

1-2-3 release 4 for Windows uses the ROUNDM function in place of FLOOR and CEILING. With the date in column A and the time in column B, use **(@ROUNDM((A2+B2),0.25,1)–@ROUNDM((A1+B1),0.25,–1))*4**.

Getting Data From the Current Row in Excel 5.0

Q For many years, I used PlanPerfect to calculate payroll and other reports for the workers in our factory. Now I've purchased Excel and want to know how I can extract data from the current row of the employee database into the pay slip without using criteria.
Ivica Kartelo, Split, Croatia

A The solution, which relies on formulas with *implicit* range name references and a simple macro, is subtle but potent. For an implicit reference, you create a range that refers to an entire column and one that refers to an entire row; you can then refer to specific cells where the column and the row intersect. This means you can easily refer to many individual cells by name without having to name every cell.

To illustrate, let's use the worksheet shown in the top portion of **FIGURE 1**. The database of worker information is shown at A1:D13; the formulas you want to use in the pay slip are in G5:G7. To set up the worksheet, enter the labels and values shown in A1:D13, and the labels in F5:F7. Define the range names illustrated in the list at cell H2 as follows: Select column B, then choose *Insert•Name•Define*, select or type **WORKER**, and click *OK*. Repeat the procedure to define the names *DATE* for column C and *WAGE* for column D, and in similar fashion, select row 10 and name it *CURRENT.ROW*. Format cell G6 to accept dates.

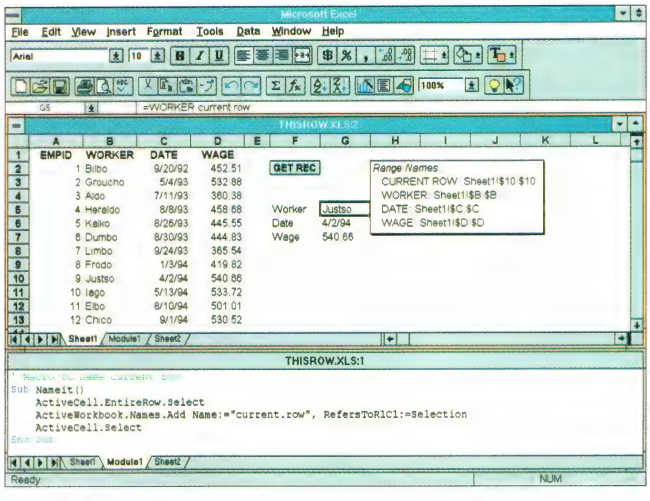

FIGURE 1: USE IMPLICIT RANGE NAME REFERENCES in Excel as an elegant way to extract data without criteria.

Now enter the following formulas: In cell G5, enter **=WORKER CURRENT.ROW**; in G6, **=DATE CURRENT.ROW**; and in G7, **=WAGE CURRENT.ROW**.

Here's how the formulas work: WORKER in cell G5 refers to the entire column of names; likewise, CURRENT.ROW refers to all of row 10. The space in the formula, called the *intersection operator*, causes Excel to find the cell where WORKER and CURRENT.ROW intersect (B10). Thus, even though there's no cell explicitly named WORKER CURRENT.ROW, cell B10 is the implicit reference of the formula.

Now we need a way to make the range CURRENT.ROW move along with the active cell. That's where the macro shown in the bottom window of Figure 1 comes in. To create it, click the page tab for *Sheet2*, then select *Insert•Macro•Module*. A new macro sheet, Module 1, appears in the workbook. Enter the macro exactly as shown in the figure.

Return to *Sheet1*, and create a button to execute the macro: Select *View•Toolbars*, click *Drawing*, and then click *OK*. Click the Button tool, shown here, and

drag it to make a button like the one shown in the top window in column F. In the Assign Macro dialog box, click *Nameit*, then click *OK*. Select the text in the button, and type **GET REC** as shown.

To use the macro, select a cell in any worker record and click the GETREF button. The macro redefines the range name CURRENT.ROW to refer to the currently selected row, which changes the implicit references of the formulas in G5:G7, so they display the values from the current row.

Here's how the Excel 5.0 macro works:

Sub Nameit() assigns the macro name.

ActiveCell.EntireRow.Select selects the current row.

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Master Class: Creating Histograms With Excel 5.0

This month's *Master Class* was prompted by a letter from Excel user Estis Pilgrim of Boston, who writes, "I've just joined a quality improvement team that is monitoring the time patients spend in an emergency room waiting to be seen by a physician. If we want to find out why some patients have long waits, we must have a clear picture of the variability in the times. So we need a histogram—a chart that shows the number of patients who waited less than 20 minutes, the number who waited from 20 to 40 minutes, the number who waited from 40 to 60 minutes, and so on. Preparing the graph itself is simple; what I need is the best way to reduce a long list of 150 times into the necessary frequency distribution."

There are three basic ways to set up a frequency table for a histogram in Excel: use the Histogram tool, set up an array formula using the FREQUENCY() function, or use Excel's new Pivot Table feature to calculate the frequencies.

Since the Histogram tool is virtually self-explanatory (and since space here is short), I'll concentrate on the other, more dynamic methods. But if you want to check out the Histogram tool, select *Tools • Add-Ins,* click the *Analysis ToolPak* box, then select *Tools • Data Analysis • Histograms.*

Using an Array Formula

FIGURE 1 shows an abbreviated version of Mr. Pilgrim's data in column C of Sheet1, with the waiting times in minutes. The array formula to calculate the histogram frequencies is located in column F. To set up this formula, you begin by entering the Bin values like those shown in range E2:E16, then you build the array. In this case, you select the Frequency range F2:F16, type =FREQUENCY(, click the *C* in the worksheet frame to select all of column C, type a comma, select the Bin range E2:E16, type), and press <Ctrl>-<Shift>-<Enter> to array-enter the formula.

To create the histogram shown, select E2:F16, click the Chart Wizard tool, and drag a box for the graph. In the Chart Wizard dialog box, click *Next,* and in Step 2, click on the column chart; in Step 3, choose option *1.* In Step 4, change the Use First option for rows from 0 to *1.* In Step 5, set Add Legend to *No,* and enter appropriate titles for the axes. Click *Finish.* Now, to remove the space between bars (the customary way to show histograms), double-click the chart to edit it, then right-click one of the bars, select *Format Column Group,* and click the *Options* tab in the dialog box. Set Gap Width to *0.*

Because the array formula refers to all of column C, the chart automatically reflects any new waiting times you add to the list.

Pivot Tables for External Data Access

An alternative to the array is Excel's powerful new Pivot Table feature, which quickly groups frequency data into bins. The results of a Pivot Table are shown in Sheet17 of Figure 1. To set up the table, click any cell in the list of waiting times on Sheet1, then choose *Data • PivotTable.* Click *Next* twice to move to Step 3 of the Chart Wizard's dialog box. Drag the Time field button once into the ROW area, then again into the DATA area. Double-click the *Time field* button in DATA, and change the Calculation Method to *Count.* Click *OK,* then *Finish,* and the Pivot Table appears on a new worksheet with one row for each unique time value. To group the time values into bins, select one of the values, then click the Group tool on the Query and Pivot tool bar. Change the Starting At value to 0, change the By value to 20, click *OK,* and you're ready to build the chart. Use the Refresh Data tool to update the table with fresh data within the selected range.

Note that while the "shape" of the results is similar, the two methods slice the bins differently. The array frequencies should be interpreted as follows: No times are less than 0; 7 times are greater than or equal to 0 but less than or equal to 20; 33 times are greater than or equal to 20 but less than or equal to 40, and so on. In the Pivot Table, the first row indicates 7 values greater than 0 but less than or equal to 20, the second row indicates 33 values greater than 20 but less than or equal to 40, and so on.

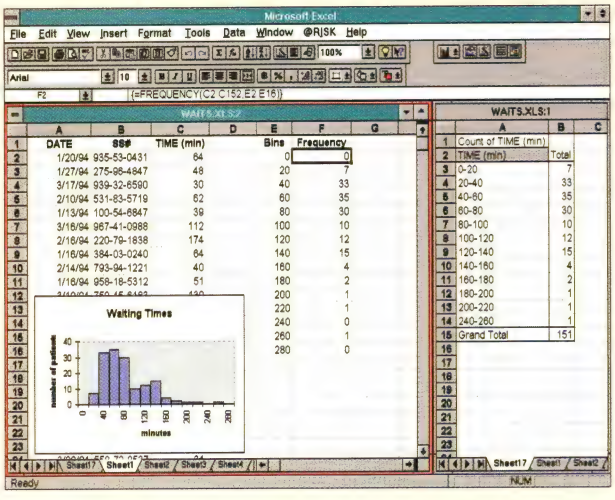

FIGURE 1: EXCEL'S FREQUENCY() FUNCTION and Pivot Tables help you create histograms to analyze data grouped into bins.

ActiveWorkbook.Names.Add Name:="current.row", RefersToR1C1:=Selection defines CURRENT.ROW to refer to the current selection.

ActiveCell.Select reduces the selection to the first cell in the row.

End Sub ends the macro.

For those of you who are still using release 4.0, here's the equivalent XLM macro:

```
=SELECT("R")
=DEFINE.NAME("CURRENT.ROW",SELECTION())
=SELECT(ACTIVE.CELL())
=RETURN()
```

To set up the Excel 4.0 macro, open a new Macro sheet, enter the statements listed at left, starting in cell A1, and select A1. Select *Formula • Define Name,* enter **Nameit** as the name, click the *Command* radio button, enter **N** in the Key field, and then click *OK.* In your work-

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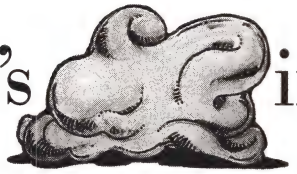
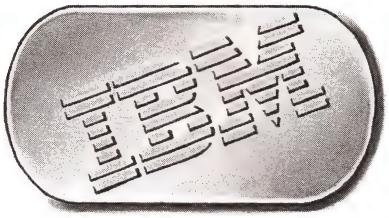
there's  in the A: drive,

there's an  on the front,

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sheet, press **<Ctrl>-N** to update the field name.

Like they say, ask a simple question, and there's no telling what you'll get!

Fixed Decimals (and More) in Excel

Q I don't like typing decimal points when entering currency amounts in Excel 5.0 spreadsheets. I want to enter, say, 123 and have Excel treat it as 1.23. This treatment would apply only to currency cells, since it would be inappropriate for cells that contain other kinds of numbers. Do you have any suggestions?

Ken Elder, Oklahoma City

A Although you can't format a cell to insert decimal places automatically, you can use the Fixed Decimals option to apply fixed decimal places to *all* numeric entries. (This trick works only in Excel.) Select *Tools • Options*, click the *Edit* tab, select *Fixed Decimal* (making sure the number of decimal places is set to 2), and click *OK*.

Since you don't want to use fixed decimals for all cells, you can make it easy to toggle them on and off by creating a macro: Select *Tools • Record Macro • Record New Macro*, and click the *Options* button to extend the dialog box. Now, in the *Macro Name* text box, enter **AutoDecimals**. (If you want to toggle the decimals from the keyboard, click the *Shortcut Key* check box and enter a suitable keystroke—perhaps **D**). In the Store In group, select *Personal Macro Workbook* and click *OK*. The macro tool bar appears; click the *Stop* button to halt recording.

You've just created an empty macro in your PERSONAL.XLS start-up file. Excel retrieves this hidden workbook whenever you launch the program, so the macros it contains are available from any worksheet.

Now add the necessary commands: Select *Window • Unhide*, then *PERSONAL.XLS*, and click *OK*. Edit your macro as follows:

```
Sub AutoDecimals()
  If Application.FixedDecimal = True Then
    Application.FixedDecimal = False
  Else
    Application.FixedDecimal = True
  End If
End Sub
```

After you have finished editing your macro, choose *Window • Hide* to return to your worksheet.

At this point, you can use your macro to toggle the fixed decimal point formatting on or off by pressing **<Ctrl>-D** (or whatever keystroke you assigned). But let's go a step further and add a custom tool to the Standard tool bar to run your macro.

Select *View • Toolbars* and click *Customize*. In the Categories list, click *Custom*, then drag the calculator icon (or any icon you prefer) onto the Standard tool bar. When you release the mouse, the Assign Macro dialog box appears. Select *PERSONAL.XLS!FixedDecimal*, click *OK*, then click *Close*. And there you go. Now you can just click the calculator tool to toggle fixed decimals on and off.

By Richard Scoville

PC World *contributing editor Richard Scoville is a software training consultant based in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions (see page 12 for contact information).* ■

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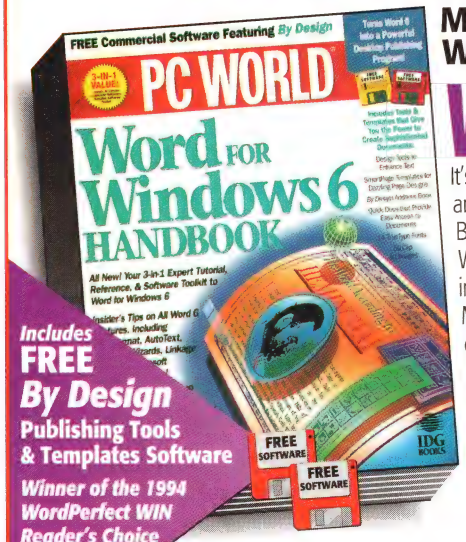

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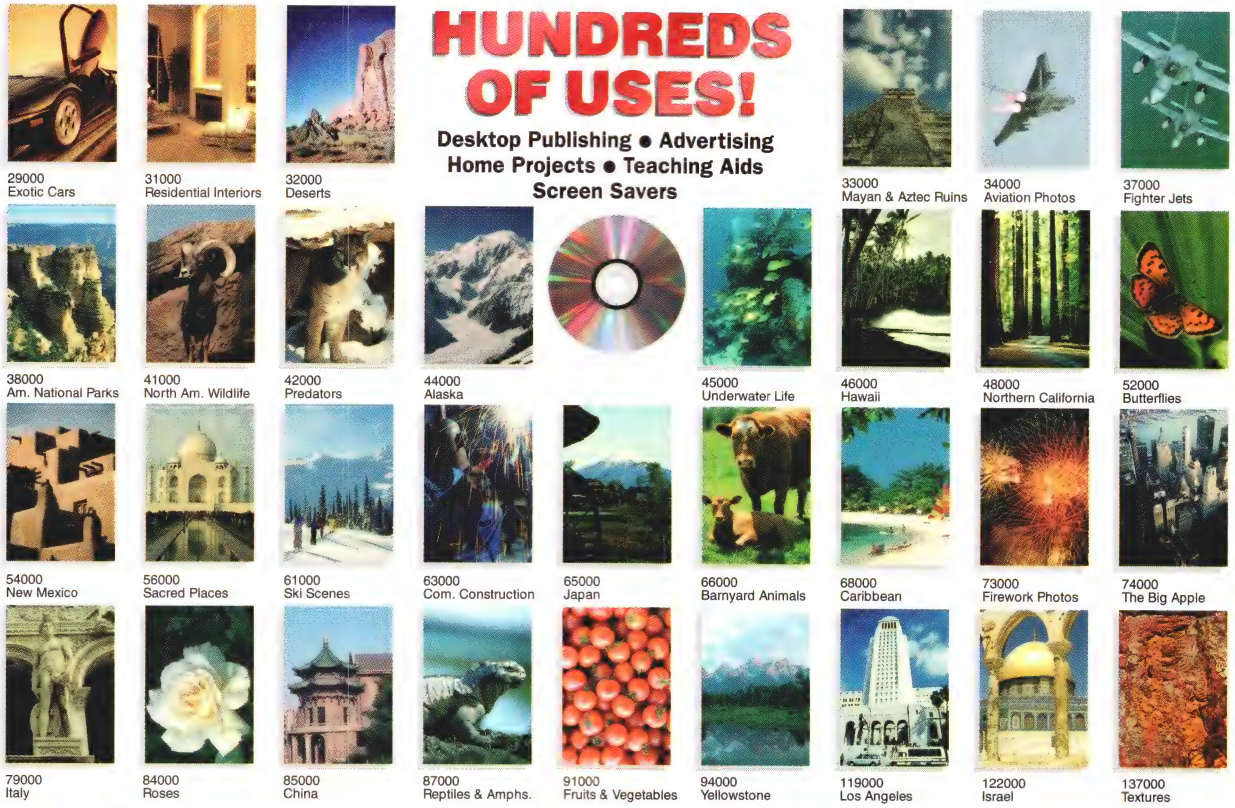

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WORD PROCESSING Q & A

From WinWord to DOS and Back Again

Q Is there a simple way to shell out to DOS while working on a document in Word for Windows? I know I could switch to Program Manager, but isn't there an easier way?
Mel Kuhbander, Louisville, Kentucky

A You'd think Microsoft would have thought of this one, but I couldn't find a DOS icon anywhere in the program. Still, the solution is easy. You can write a simple, one-line macro and assign it to the tool bar. Here's how:

With WinWord 6.0 running, select *Tools•Macro*. Type **ToDOS** in the Macro Name box, then click *Create*. A new window will appear. Between the lines 'Sub Main' and 'End Sub', type **Shell "DOSPRMPT.PIF"**. Select *File•Save All*, answer *Yes* to any confirmation requests, and select *File•Close*.

To make your new macro more accessible, you could assign it to a shortcut keystroke or an icon on the standard tool bar. To assign it to a key combination, open *Tools•Customize*, select the *Keyboard* tab, scroll down the Categories list until you get to *Macros*, and select *ToDOS* from the Macros list. Activate the Press New Shortcut Key box by pressing **<Alt>–N**, then press the key combination you want to use to shell out to DOS. To finish, click *Assign*.

To assign the macro to an icon on your standard tool bar, select *Tools•Customize*, then click *Toolbars*. Select *Macros* from the Categories list, then find *ToDOS* in the Macros list. Position the mouse pointer over *ToDOS* and hold down the left mouse button. A square outline should appear on the screen. Drag this outline up to the tool bar and drop it where you want the icon to appear.

When you release the mouse button, the Custom Button dialog box should pop up. You could pick one of the icons shown there, but since none of them are really appropriate, I'd use a text button instead. To do this, click *Text Button*, then type **ToDOS** in the Text Button Name box (if the name isn't already there). Select *Assign* and *Close*, then *File•Save All*, and you're done. From now on, whenever you need to shell out to DOS, just click your new icon. To return to Word for Windows and your document, type **Exit** at the DOS prompt and press **<Enter>**.

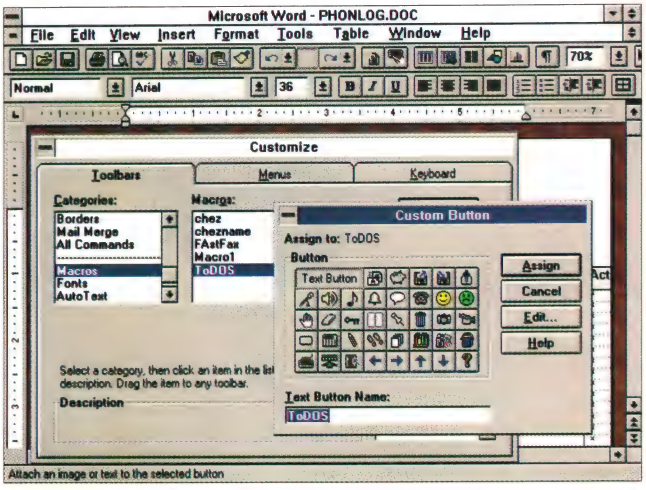


FIGURE 1: SHELL OUT TO DOS FROM WINWORD with one mouse click by creating the ToDOS macro, then assigning it to a tool bar button.

Jumping Back in WinWord

Q I use Word for Windows to edit extremely large documents. (When I say large, I mean I'll work on a single document for days or even weeks at a time.) Each morning when I resume work, I'd like to go right to the last place I edited or to the end of the text. I know I could create a bookmark before exiting WinWord, but isn't there a faster way?
Phil Barber, Spring, Texas

A Would a single keystroke be fast enough for you? Word for Windows has a couple of key combinations that will do exactly what you want. After you open the document, press **<Shift>–<F5>** to return to where you were working at the end of your last editing session. To jump to the end of the document, press **<Ctrl>–<End>**. By the way, these keystrokes work in WinWord versions 2.0 and 6.0.

Odd/Even Printing in WinWord 6.0

Q In the March 1994 issue, you said Word 6.0 for Windows had a command for printing odd or even pages ("Duplex Printing in Word 2.0 for Windows"). I've looked, but I can't locate this command anywhere, and there's no mention of it in the manual's index. What's the deal?
William Maclay, Los Gatos, California

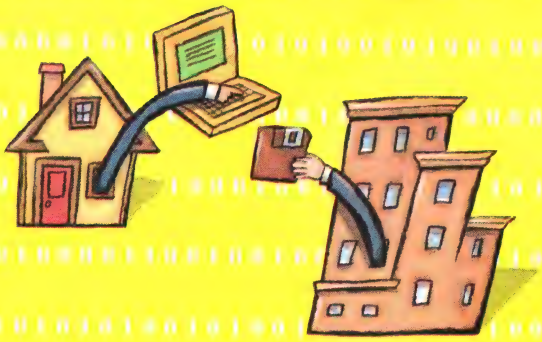
A The options are there, but they may not be where you'd expect. To print odd or even pages in WinWord 6.0, select *File•Print;* then, in the Print dialog box, drop down the *Print* list. You'll find the Odd Pages and Even Pages options there.

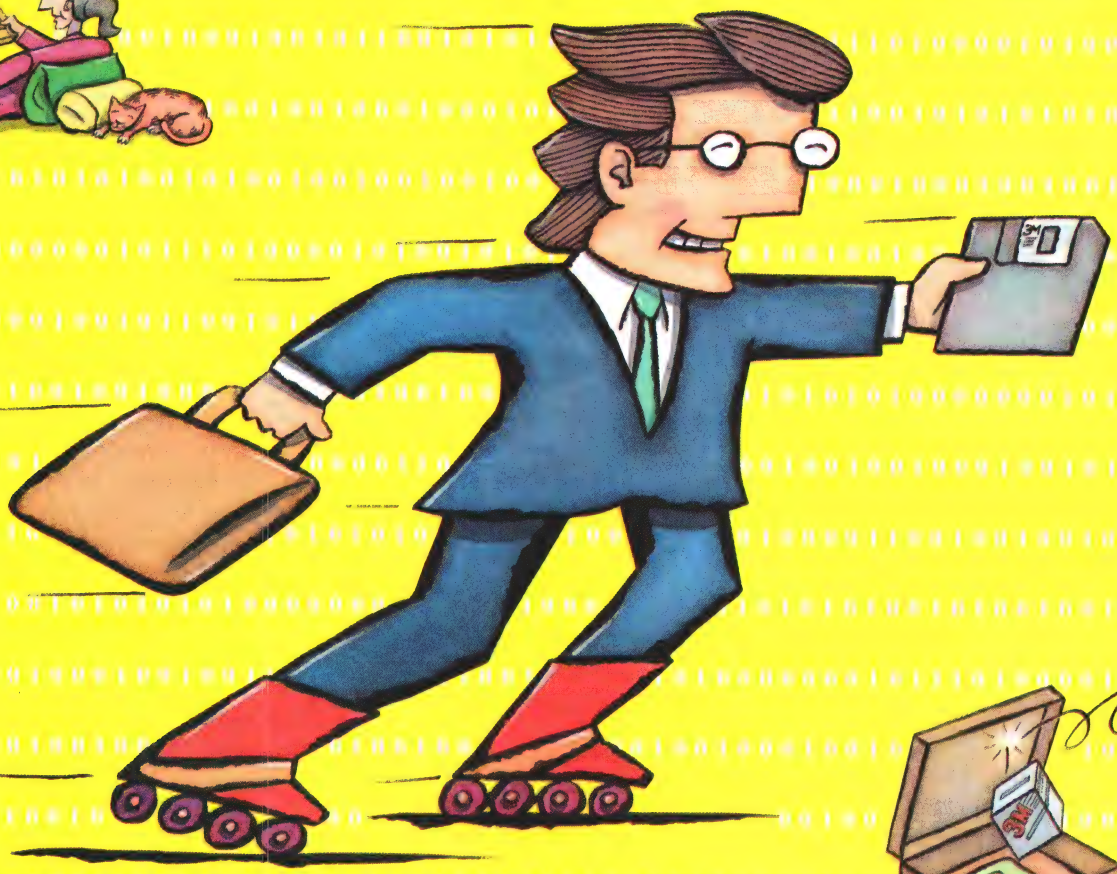
Suggested Spelling for WinWord

Q I routinely add words to the standard custom dictionary during spelling checks in Word 2.0 for Windows. This is great, except for one thing: If I later misspell one of those words, WinWord tells me it's spelled incorrectly but doesn't then suggest the correct spelling I've added to the custom dictionary. How do I get WinWord to suggest words from custom dictionaries?
Jim Rodimon, Leesburg, Virginia

A This is indeed a shortcoming in versions of Word for Windows through 2.0. There is simply no way to make the program suggest all those words you've painstakingly added to the custom dictionary. However, version 6.0 has rectified this shortcoming, so an upgrade to the latest version will solve your problem. To take advantage of this improvement, select *Tools•Options*, then click the *Spelling* tab. Mark the *Always Suggest* check box, make sure *From Main Dictionary Only* is unchecked, then click *OK*.

Run with it.





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Too Many Button Bars in WordPerfect 6.0

Q I like the specialized button bars in WordPerfect 6.0 for Windows, but switching from one to another is such a hassle. I usually end up using the default set. Do you know of a shortcut that will quickly and easily get me to the button bars I want to use?
Ephraim Goldman, Denver

A The new crop of Windows word processors, including WordPerfect 6.0, have at long last discovered the right mouse button, and that's precisely where your answer lies. Just right-click on your current button bar to pop up a menu that lists all the *other* button bars that are available to you. Then, using the left or right mouse button, click the name of the bar you want to activate. Incidentally, if you click the right mouse button when the mouse pointer is on other objects in the WPWin window, the action will call forth a variety of context-sensitive pop-up menus.

Blue Backgrounds in WordPerfect 6.0 for Windows

Q I recently upgraded from WordPerfect 5.2 for Windows to version 6.0, and the colors of 6.0's editing screen bother me. I liked the blue background in version 5.2's draft mode because it was easy on my eyes. Is there a way to get this blue background in version 6.0?
William Cai, Bethesda, Maryland

A I have good news and bad news for you. While it's possible to have a blue background in WPWin 6.0, you're probably not going to like what it does to the rest of your Windows environment. WPWin lets you use either the default black-text-on-white-background color scheme or your Windows system colors. That means the only way you can get white text on a blue background is by modifying your global Windows colors. But if you do, Windows will then use these same colors in all your other applications as well as in the Program Manager desktop. If you still want to use those blues, though, here's what do:

Open the Windows Control Panel and double-click the *Color* icon. In the ensuing dialog box, select *Color Palette.* Choose *Window Background* from the Screen Element drop-down list, then click one of the blue *Basic Colors* blocks. Next, change the color of text by choosing *Window Text* from the Screen Element list and clicking the white color block. Check the sample window. When the screen looks the way you want it, click *OK,* then close the Control Panel.

To make these system colors the WordPerfect defaults, start WPWin and select *File•Preferences.* Double-click the *Display* icon, and choose the *Document* option if it isn't already selected. Mark the *Windows System Colors* check box in the Show frame, click *OK,* then *Close* to finish the job.

Lines Between Columns in WordPerfect 5.1 for DOS

Q I create three-column newsletters in WordPerfect 5.1 for DOS and I would like to insert a vertical line between each column of text. Try as I might, however, I'm unable to find a simple way to do this. Can you help?
Alan Blandamer, Silver Spring, Maryland

A Getting those lines in place isn't tough, but the commands you need are buried deep in the Graphics menu. I'll give you the keystrokes you need to insert the lines; as you press these keys, keep an eye on the screen to see what each keystroke is actually doing. Start with the cursor in front of the first character in the first column. To insert a line between column 1 and column 2, press **<Alt>-<F9>52131<Enter><Enter>**. For the line between columns 2 and 3, press **<Alt>-<F9>52132<Enter><Enter>**.

That's it. You won't see these lines on the editing screen, but you can see the effect by pressing **<Shift>-<F7>V** to display a print preview. If you're going to insert lines between columns often, you might want to record these keystrokes as macros, to save time.

Switching Windows in Ami Pro

Q I usually work with four or five documents at a time in Ami Pro 3.01. I prefer to display each document full screen, rather than cascaded or tiled, and I end up using the document list in the *Windows* menu to move from one document to another. It seems to me there must be an easier way to achieve this. Any suggestions?
Betty Allen, Chicago

A You can use a simple keystroke combination to cycle through your Ami Pro document windows: Just press **<Ctrl>-<Tab>** or **<Ctrl>-<F6>**. Watch the Ami Pro title bar to see which document is currently displayed. If you want to cycle through your documents in the opposite direction, press **<Shift>-<Ctrl>-<F6>**. Strangely, <Shift>-<Ctrl>-<Tab> does not have the same effect. By the way, one or more of these keystrokes will have the same effect in virtually every Windows application.

By George Campbell

George Campbell is a contributing editor for PC World. Word Processing *welcomes your questions (see page 12 for contact information).*

POWER TIP no. 307

Easy Format Protection

Protect your hard disk against an accidental format by using DOS's LABEL command to label it. The reason this works—you must enter the disk's volume label before the FORMAT will proceed. Here's how to do it: Log on to the drive and at the command line, type LABEL and a space, followed by a label of 11 or fewer characters. For added security, include the Null character in the volume label by holding down the <Alt> key and typing 255 on the numeric keypad. With this addition, hopefully, anyone accidentally (or surreptitiously) trying to format your drive will look at your volume label and mistake the Null character for a space. That means they won't know how to enter it properly as part of the format command and therefore won't be able to format your disk.

Ken Johnson
Oak Park, Illinois

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Circle 220 on reader service card

WINDOWS Q & A

Font Madness

Q I have tons of TrueType and PostScript fonts (via Adobe Type Manager) installed on my PC. Trouble is, some TrueType fonts have exactly the same name as some PostScript fonts, but only one name appears in my word processor's font list. Which one am I getting—TrueType or PostScript? How can I select a different one? And is it a bad idea to have different fonts with the same name?

Raymond Chi, San Francisco

A The biggest problem with identical font names is that, regardless of what appears on screen, you can't always predict what printed output will look like. Fortunately, you can correct the problem—and have access to both fonts—by changing the name of the matching PostScript font using Windows Write.

TrueType and PostScript fonts with identical names are fairly rare, but when they crop up on the same PC, they can raise hell. (A common example is Symbol, which comes in both TrueType and PostScript versions.) When fonts with matching names collide, only one name appears in your application's font list—and the icon next to the name doesn't tell the whole story.

Consider what happens in Windows Write when a TrueType font and a PostScript font have matching names on a system running Adobe Type Manager (ATM) 2.6. Write's font dialog box lists only the TrueType font, but when you apply the font to selected text and print it out, you see the PostScript font.

Microsoft's *Windows Resource Kit* implies that you can solve this problem by making TrueType fonts dominate in the case of fonts with matching names. According to this theory, all that you have to do is add the line **TTIfCollisions=1** to the [TrueType] section of WIN.INI and then restart Windows. Unfortunately, with many applications this trick only affects screen fonts, not printed output.

The only sure way to resolve this confusing state of affairs is to rename one of the fonts. Renaming a TrueType font requires a third-party utility like Font Monster 3.4 from Leaping Lizards (shareware, available on PC World Online as FMONST34 .ZIP). However, you can rename an ATM PostScript font by editing it in Windows Write. Launch Write and locate the font files you need to change—the main font file with a PFB extension (typically found in the \PSFONTS subdirectory) and the matching font metric file with the PFM extension (this is usually found in the \PSFONTS\PFM subdirectory). Consult your ATM manual for the precise file names associated with each font.

To be safe, make backup copies of the PFB and PFM files. Then open the PFB file, selecting *No Conversion*. Once the file is up, select *Find•Replace*, and in the Find What box type the name of the font as it appears in your word processor's font list. In the Replace With box, type in a new name with *exactly* the same number of characters as the old one. Select *Replace All*, then *Close*, and save the file. Repeat this process for the PFM file.

Next, open the ATM Control Panel. Select the old font that conflicts with your TrueType font and click *Remove*. If necessary, click *Yes* to confirm your choice (the file remains on your hard drive). Then click *Add*, select the new font name stored in the \PSFONTS \PFM directory, click *Add* again, then *Exit*. You don't need to restart Windows, but you may need to restart your word processor, or at least open and close the current document. Your font dialog boxes now show two different font names, and the conflict is resolved.

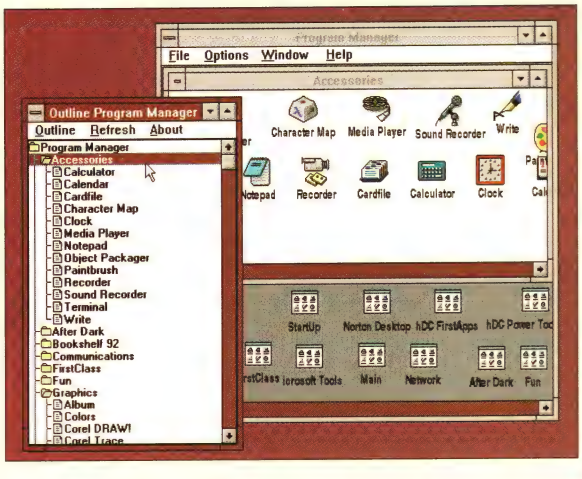
Restoring Print Screen to DOS

Q I use Procomm Plus 1.1 for DOS to communicate with my company's mainframe. I often use the <Print Screen> key to print displays and E-mail messages. But under Windows I must use Procomm's Screen Snapshot function instead, then retrieve the snapshot file in WordPerfect, reformat it, and print it. Is there some way to print a DOS screen in Windows, without jumping through all these hoops?

Michael P. Bednowicz, Wasco, Illinois

A Easy as pie, Michael. You can prevent Windows from monopolizing the <Print Screen> key with a simple

Windows Toolbox



Lost in a sea of icons? Tired of sifting through group windows? If you've reached the limit of Program Manager's usefulness, try Outline Program Manager 1.0—a Program Manager enhancement (not replacement) that displays groups and icons in a file-tree format similar to File Manager's. You'll be surprised how quickly you can find a program once it's in this alphabetized list. Best of all, Outline Program Manager is absolutely free. Available as OPM.ZIP on PC World Online and other online services. Note: The program requires VBRUN300.DLL, available on most online services.

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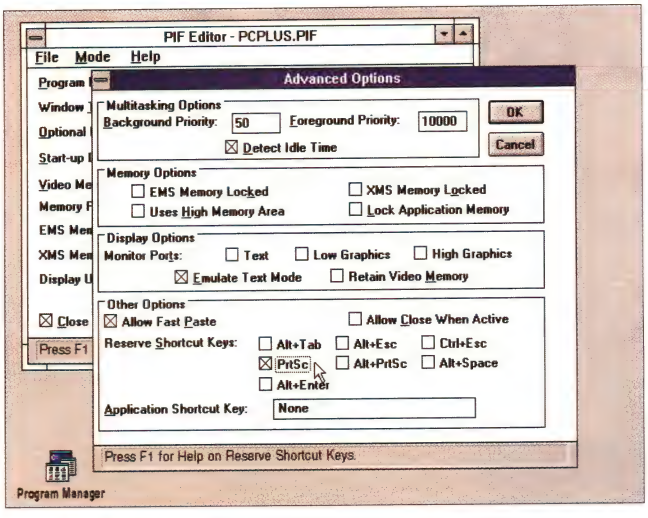

PRINT SCREENS FROM DOS PROGRAMS: Adjust a DOS application's PIF to prevent the Clipboard from intercepting a print screen command.

change to the DOS application's Program Information File (PIF). Launch Windows' PIF Editor, select *File•Open*, and locate the PIF that runs Procomm (it should be named something like PCPLUS.PIF). Click *Advanced*, and under the Other Options section check the *PrtSc* option. (Leave Alt+PrtSc unchecked, however, in case you need to perform a print screen in Windows—say, copy a Procomm screen to another application via the Clipboard.) Click *OK* and save the PIF. Windows will no longer route DOS print screens to the Clipboard. The next time you run Procomm, press **<Print Screen>**, and the screen image will hustle down to the printer just as it did before Windows.

Cleaning Up Norton Desktop

Q Norton Desktop for Windows created three files in my WINDOWS directory for every program group. The files start with the group's name and end with the extensions QA1, QAB, and QAG. Can I delete these files?
Shirley Nolan,
Newark, New Jersey

A You can safely delete the QA1 and QAB files. The QA1 files were created when you upgraded to a newer version of Norton Desktop; the QAB files are backups of the QAG files and are updated every time you save the desktop configuration. Don't delete any QAG files—Norton needs these.

Cheap Reminders, Part II

Q Windows Calendar is fine if you need to set an occasional alarm. But what if you need to set a lot of alarms?
Marie Deet,
New Iberia, Louisiana

A Calendar isn't appropriate if you need frequent, regular alarms over a long time period. For such chores I turn to PIMs like Time & Chaos (this is available on PC World Online as TCHAOS.ZIP). Also consider Stress Free, a daily calisthenics reminder from LifeTime Software (a demo is available on PC World Online as STRESW.ZIP). And check out "Take a Break With Visual Basic" in June's *Star-Dot-Star* (also on PC World Online) for a program that can do the job.

- **Time & Chaos;** Isbister International; 214/495-6724
  Reader service no. 635
- **Stress Free;** LifeTime Software; 800/947-2178
  Reader service no. 636

Custom Start-Up Screens

Q Is there a way to replace Microsoft's start-up logo with one of my own in the same picture format?
Tony Smith, League City, Texas

A You can, but you'll need a picture in 4-bit (16-color) RLE format. (A 4-bit image with fewer colors will work, too.) Although Windows Paintbrush can't save images in this format, many shareware programs can, including WinGif and Paint Shop Pro (available on PC World Online as WINGIF.ZIP and PSP2.EXE, respectively). Also, your picture can't exceed 50K in size.

Once you've created the desired picture, exit Windows, and at the DOS prompt log on to Windows' SYSTEM subdirectory. Enter the command **COPY /B WIN.CNF+VGALOGO.LGO+***C:\PIX\MY_LOGO.RLE* **C:\WINDOWS\WIN2.COM**, substituting the location and name of your RLE file for *C:\PIX\MY_LOGO.RLE*.

This command creates a new executable file (WIN2.COM) with the logo embedded in it. To see your new image at start-up, type **WIN2** at the DOS prompt and press **<Enter>**.

Cleaning Up After the Virus Checker

Q My hard disk is littered with hundreds of files named CHKLIST.MS. They are not all identical, and they're scattered throughout my directories. What are they for? Can I blow them away and reclaim some disk space?
Bob Karby, PC World Online

A You can blow them away, Bob, but these beasties may return. You're apparently using DOS 6's Microsoft Anti-Virus, which creates these files to record information about executable files (such as file size, date, and DOS attributes) in order to detect unauthorized changes made by viruses. Every time you click Detect or Detect and Clean, Anti-Virus scans the appropriate CHKLIST.MS files. If it finds changes in the executable files, it asks you to confirm them. Delete the CHKLIST .MS files, and Anti-Virus won't have any reference point. Besides, the next time Anti-Virus scans your disk for viruses, it will generate new CHKLIST.MS files all over again.

If the CHKLIST.MS files really bug you—and you're willing to settle for a virus checker that only detects known viruses—here's what to do. Launch Microsoft Anti-Virus for Windows by choosing *Tools•Antivirus* in File Manager. Select *Options•Set Options*, uncheck *Create New Checksums*, and click *OK*. This prevents Anti-Virus from generating new CHKLIST.MS files. To remove existing ones, select the appropriate drives in the Anti-Virus dialog box, then select *Scan•Delete CHKLIST files* and *Delete*. Happy housekeeping.

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).* Windows Q&A *welcomes your questions (see page 12 for contact information).*

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Circle 23 on reader service card

OS/2 Q & A

Getting Your Arrows Straight

Q Menus in OS/2 programs sometimes have a plain, right-pointing arrow and sometimes have a 3-D button arrow. What's the difference?
Harold Chaney, New York

A The arrows mean very different things. The plain arrow tells you there's a submenu, which you'll get when you select that menu option. The 3-D button arrow tells you there's a submenu *and* a default choice: Click the arrow and you get the submenu; click anywhere else on the menu item and you get the default.

Here's an example: Right-click an open folder—away from any items inside—to bring up its property menu. Toward the bottom of the menu you'll see Select and Sort options. Select has a plain arrow, and Sort has a 3-D arrow.

Click the word *Select* or the arrow next to it, and a submenu pops up with the choices Select All and Deselect All. Nothing fancy here. Now bring up the menu again and click the word *Sort;* OS/2 sorts the items in the folder by name—the default sort option. Bring up the menu one more time, and click the 3-D button arrow next to Sort. A submenu of sorting options pops up, with the default Name checked.

These defaults are a real convenience, saving an extra step every time you want to perform a frequently repeated action.

Are You Too Organized?

Q Playing around with my desktop menu, I managed to hit Sort by mistake. Now there's a plain row of icons in place of my once perfectly crafted desktop. How can I recover it?
Susan Feraway, Internet

A Once you've sorted and then shut down your system, there's no way to restore the desktop to its former state. That's because OS/2 saves the state of your desktop and folders every time you shut down. IBM could prevent a lot of headaches if it gave users a chance to abort or undo a sort.

But if it ever happens again, you can recover your desktop before shutting down. You've probably been told to always shut down the system properly before turning off the power or pressing <Ctrl>-<Alt>-<Delete>. Well, here's an exception. If you've messed up the desktop, close all open applications, saving files when necessary. Then, without first using the Shut Down command, press **<Ctrl>–<Alt>–<Delete>**. Don't use the reset button or the power switch, however, or you may lose data in your disk cache. When OS/2 reboots, your desktop will be restored.

Why does this work? When you close your applications, then flush the disk cache with <Ctrl>-<Alt>-<Delete>, your data is saved to disk. But OS/2 doesn't save the desktop configuration until you shut down properly—which you don't do here. Under all other circumstances, however, you should always shut down your system safely.

Running Multiple Copies of a Program

Q Most of the time, double-clicking an application's icon launches the application. But if the application is already running, double-clicking the icon brings up just the running session. How do I start another instance of a running app?
Alma Garcia, Los Angeles

A OS/2 defaults to bringing up a currently running application when you double-click its icon. That's generally what you want, but sometimes you might need to start another session instead. Unfortunately, you can't tell OS/2 to make an exception just *this* time, but you can set it up to always launch multiple instances, either globally or on an application-by-application basis.

For a specific application, right-click its icon, then click the Open arrow and select *Settings*. Choose the *Window* tab, and under 'Object open behavior' click *Create new window*. After you close the settings window, you'll be able to run multiple instances of that application.

To make multiple instances the global default, right-click the desktop and choose *System setup*. Double-click the *System* icon and select the *Window* tab. From here, follow the instructions in the previous paragraph.

By Lou Miranda

Lou Miranda is a PC World *contributing editor and an OS/2 programmer and consultant based in Minneapolis–St. Paul.* OS/2 *welcomes your questions (see page 12 for contact information).*

From Windows to OS/2

Running DOS Programs

Changing a DOS program's settings in Windows can be kind of clumsy. That's because you have to mess with a program information file (PIF), which defines how your DOS program should run. There's not even a convenient way to bring up the PIF for editing.

In OS/2, modifying a DOS program's settings is much easier. Once you have its icon on your desktop, just right-click it, click the Open arrow, and choose *Settings*. Select the *Session* tab, then click the *DOS settings* button. At this point, you can completely customize the DOS settings. When you're done, close the dialog box.

By the way, one useful feature that can often save memory is the DOS_DEVICE setting. This allows you to load device drivers into an individual DOS session, where they won't waste space in other sessions. For example, you may have an application that requires a special device driver, but putting that driver in CONFIG.SYS wastes memory in your other DOS programs. Remove it from CONFIG.SYS and put it in the DOS_DEVICE setting for the program that needs it—all your DOS programs will be happy.

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DATA MANAGEMENT Q & A

Using Variables in dBASE Report Titles

Q In "Mass Printing dBASE Reports by Date" [March 1994], you provided a dBASE program for printing only those records that fall within a selected date range in a report. Your program prompts the user for the values that define the date range and stores them in variables called startdate and enddate, then prints the records that fall between those dates.

How can I include these date variables in the actual titles of my dBASE III Plus reports? For example, I'd like to title one report "Receivables due by or before 06/30/94," where 06/30/94 is the value I entered for enddate. Also, can I do this for a dBASE IV report if I ever upgrade?

Paul Gellman, Mineola, New York

A You can easily add your variable dates to a report title in both dBASE III Plus and dBASE IV. First, the dBASE III method: Instead of including page titles in your report format files, you can use the REPORT command's HEADING parameter to add a different heading every time you print your report.

First, use the **MODIFY REPORT** command to enter the report designer and then remove your page title from the dBASE report. Then you modify your report-printing program with a text editor, adding the **HEADING** parameter to any appropriate REPORT FORM command. For instance, you might want to change a line that reads 'REPORT FORM RECEIVBL TO PRINT' to **REPORT FORM RECEIVBL HEADING "Receivables due by or before " + DTOC(enddate) TO PRINT**. When dBASE prints your report, it will include the new title, inserting your variable date.

You can employ the same technique to show both the start and end dates, using a command such as **REPORT FORM RECEIVBL HEADING DTOC(startdate) + " – " + DTOC(enddate) TO PRINT**. These commands will work just as well at the dot prompt as within a program.

In my testing, I found this technique unreliable in dBASE IV. Luckily, it's not needed, since dBASE IV lets you insert variables directly into your report design. Here's how.

A variable has to be in memory before you can insert it into a dBASE IV report. To create the enddate variable, go to the dot prompt and enter the command **enddate = DATE()**. You can use the same basic command to create the startdate variable. The DATE() function (which returns the current date) is a quick and easy tool for creating a date variable. At this point, it doesn't matter what date is actually in the variable; that matters only when you print the report.

Once you've defined a variable, you can include it in your report design: In the *Report•Modify* screen, select *Fields•Add* to place a calculated field in your report's Page Header Band. For the field's expression, use something like **"Receivables due by or before " + DTOC (enddate)** or **DTOC(startdate) + " – " + DTOC (enddate)**. Use the template option to make sure the field is long enough to hold the string. When you print your report, dBASE IV will automatically include the current values in your header.

Style Sheets in Paradox 4.5 for Windows

Q I have heard that Paradox 4.5 for Windows has style sheets that allow you to set formatting defaults—fonts, colors, and so on—in forms and reports. However, I can't find any mention of style sheets in the menus, Help, or printed documentation. Can you point me in the right direction?

Marie Heller, Redwood City, California

A It's hard to find information on Paradox for Windows' style sheets because they're not consistently called style sheets—or anything else. The styles are stored in what the Paradox documentation calls "SpeedBar property files," although they have little to do with the SpeedBar. These files have the extension FT. Paradox comes with several ready-made styles.

To select a style, choose *Properties•Desktop* and make a selection from the Designer Style Sheets drop-down list box at the bottom of the resulting dialog box (this is the only place I could find where Paradox uses the term *style sheets*). Click *OK* to close the dialog box. To view the style you selected, open a table and click the *Quick Form* icon (right) or press **<F7>**. Paradox creates a new form in the chosen style. To check out another style, repeat the process.

If you want to create your own style sheet, open a form in design mode and select *Properties•Designer*. In the resulting Designer Properties dialog box, click *Change Name*, enter a file name in the appropriate text box, and click *OK*.

Now it's time to save particular properties to your new file. For instance, to create a default field style, select a field and redesign it to your liking. When you're satisfied, make sure the field is still selected, then run *Design•Copy To SpeedBar* (this SpeedBar is the same file that the Desktop Properties dialog box calls a Designer Style Sheet and the documentation calls a SpeedBar property file). Oddly, you can save attributes that aren't even on the actual SpeedBar, like background color, the same way. Just select the entire page and select *Design•Copy To SpeedBar*.

To customize an existing style sheet, you essentially follow the same procedure, except that when you're in the Designer Properties dialog box you select *Change Contents* rather than Change Name. As before, copy your changes to the SpeedBar with the *Design•Copy To SpeedBar* command.

If you want to know more about SpeedBar property files, search for *Designer Properties dialog box* in Help, or look it up in the index.

Match Not Found With Paradox Zoom

Q I'm trying to use <Ctrl>-Z, the Zoom key, to find records by name in Paradox for DOS. However, I often get the message 'Match not found'

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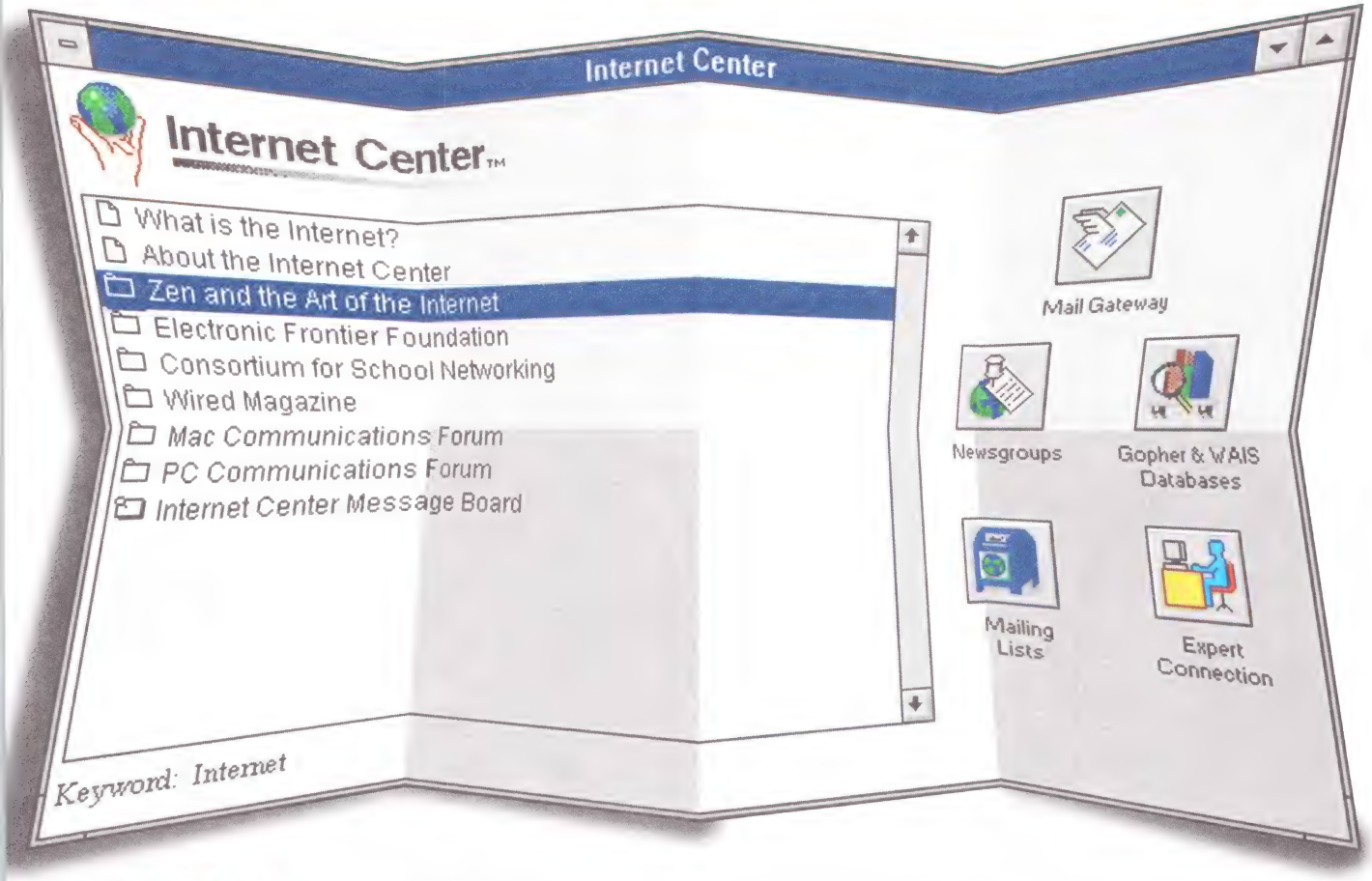

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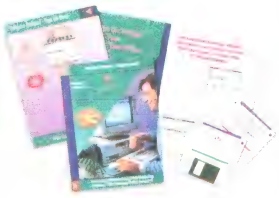

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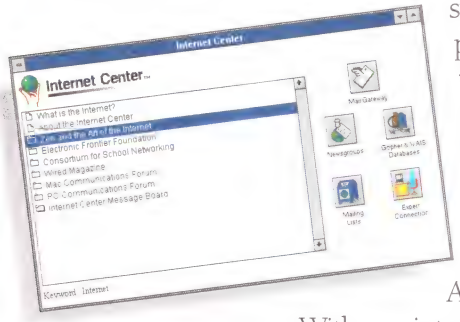

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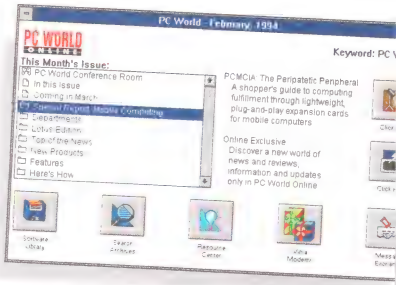

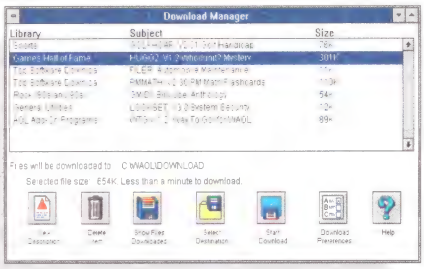

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when I know that the record actually exists. What's happening here? Is there a bug in the Zoom feature?
James Kiley, Richardson, Texas

A No, there's no bug—at least not that I've found. However, Paradox's Zoom is case sensitive by default, and that could be the problem. For example, if a record has *Jackson* in the Last Name field and you enter *jackson* as the search value, Paradox won't find a match.

You can get around case sensitivity by using a wild card in your search value. There are two allowable wild cards: @, which stands for any one character, and .., which stands for any string of characters, even an empty string. So you could find *Jackson* by entering *Jackson, jackson.., jackso@*, or even *jack...*

Locked Out in Alpha Four

Q Our NetWare network has a six-user version of Alpha Four that's supposed to let us share databases. With one of the databases, if somebody is using a file, no one else can access it until it's closed. With another database, when a second person logs on, both people get the message 'Unable to Lock. Automatically retrying', and the screen freezes for a while. This happens many times during the day and is very annoying. Is this normal behavior for a database program?
Jose L. Taboada, Astoria, New York

A The behavior isn't normal, but it's probably easy to fix. Many of the commands I describe here are available—and necessary—only with the multiuser version of Alpha Four.

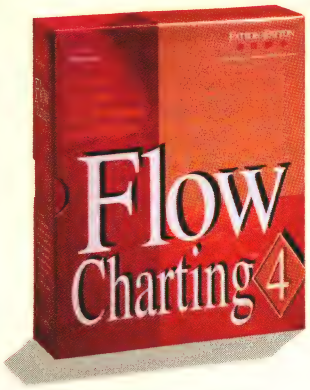
People might not be able to access a file simultaneously because someone is opening the database in Exclusive instead of Shared mode. To check your default setting for opening databases, select *Other•Configuration•Network Settings*. In the resulting screen, make sure each Alpha Four user's file-sharing mode is set to *Shared*.

As for the second problem you mentioned, there are two common causes of the 'Unable to Lock' message. If you are working in a set of related files that have referential integrity and you lock a *parent* record (one that has related detail records in another data file), Alpha Four will also lock any related *child* and sometimes even *grandchild* records. If anyone else tries to lock a different parent record that has some of the same children and grandchildren as your record, that user might encounter the 'Unable to lock' message.

You might also experience this problem on some networks if your SHARE command's /L parameter is too low. This parameter specifies how many files your workstation can lock simultaneously. You'll find the SHARE command in your AUTOEXEC.BAT file. Increase this number a bit, and see if the error message disappears.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and the author of* The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992).* Data Management *welcomes your questions (see page 12 for contact information).*



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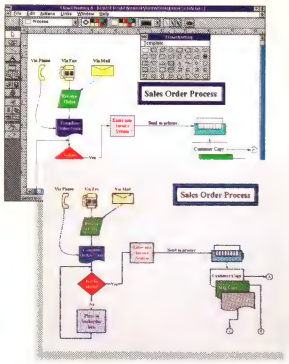

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PUBLISHING & PRESENTATIONS Q & A

Better Printing With PageMaker

Q I've got a PageMaker 5.0 document containing scanned graphics that I'm trying to print on my HP LaserJet II printer. Everything looks fine on the screen, PageMaker says it's printing the pages, and no error messages appear, but nothing comes out of the printer. What's going wrong?
Jenny Becker, Emeryville, California

Q I use PageMaker 5.0 to produce a newsletter using lots of CorelDraw Encapsulated PostScript (EPS) graphics. When I try to print the document, PageMaker balks: It prints several pages, then stops, forcing me to print the rest separately. Is this normal?
Dean Mayer, CompuServe

A Both of your questions echo others I've received about PageMaker 5.0 printing problems. The consensus is that it takes PageMaker 5.0 a lot longer to print documents than earlier versions. One of the most common causes of these printing slowdowns: overloaded printer memory.

In the case of some PCL printers (such as the HP LaserJet II), PageMaker no longer supports *banding*, whereby pages are divided into bands that go to the printer one at a time. Without banding, complex print jobs can easily overwhelm your printer's memory. Similarly, PostScript printers can run out of memory when sent PageMaker 5.0 jobs that contain a lot of downloadable fonts or EPS graphics. Worse yet, neither PageMaker nor Windows Print Manager notifies you when your printer's memory has reached its limit.

Aldus has released a patch to solve these problems. Among other things, the update lets PageMaker send document pages in bands to PCL printers that support banding, and send complete documents to PostScript printers, regardless of the number of EPS graphics, downloadable fonts, or pages. The update also fixes other printing anomalies, such as TrueType fonts that print fuzzy in small sizes, TIFF images that print too dark, and GPF (general protection fault) errors when printing through certain fax drivers.

To obtain the patch, download the free file PM50A.ZIP from Aldus's BBS (206/623-6984), the Desktop Publishing Forum on America Online (type **aldus**), or the Aldus Forum on CompuServe (**go aldus**). You can also get the update by ordering the Filter/Driver Pack Plus for Windows. To receive more detailed information on all printing problems, patch fixes, and the other Filter/Driver Pack components, contact Aldus's free fax information service at 206/628-5737 and request document 315001.

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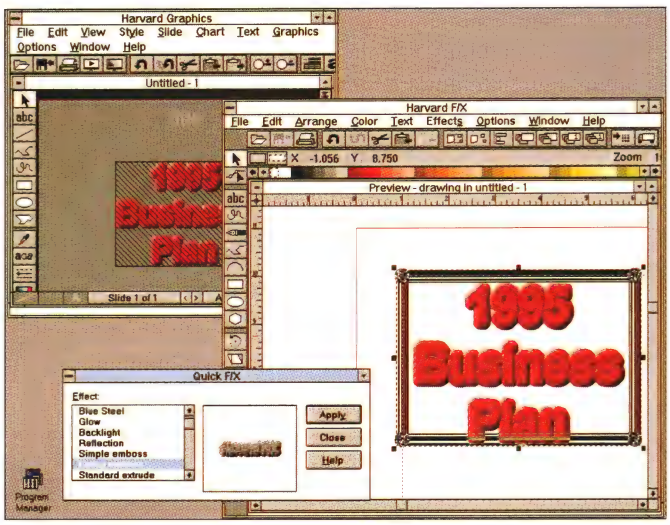


EMBELLISH HARVARD GRAPHICS PRESENTATIONS with the easy-to-use drawing effects in Harvard F/X's Quick F/X.

Spiffy Special Effects in Harvard Graphics

Q I'd like to use Harvard F/X, the drawing program that comes with Harvard Graphics 2.0 for Windows, to add some jazzy effects to a slide presentation. But the program's advanced features are pretty intimidating for someone like me, who isn't a trained artist. Any advice about how I can get started?
Valerie Navarro-Small, Washington, D.C.

A Don't despair. Harvard F/X has a feature called Quick F/X for those of us who don't have an art school diploma. Quick F/X includes over two dozen ready-made effects, including shading, fills, and sweeps, that you can apply to your slides with just a few mouse clicks.

To help you get started, here's how to create the type treatment shown in the figure. If you haven't already installed Harvard F/X, run the Harvard Graphics installation program again, select *Install selected files*, then *Harvard F/X*.

1. At the Harvard Graphics start-up prompt, select *Create new presentation*. Click *Select presentation style*, then double-click the style you want. To create the example in the figure, I used GRYSHADE.STY. Click *Select a slide type•Drawing•OK* in order to make an empty slide.

2. Select *Edit•Insert embedded object*, then specify *Harvard F/X Drawing* as the Object type, and click *OK*.

3. After Harvard F/X opens, click *New drawing* at the start-up dialog box (if displayed) to open a blank page. Select *Text•All attributes* and pick your font: I used 72-point Arial Bold, centered. I made red the default fill color by clicking on one of the red color squares in the palette at the top of the page. When you're done formatting the font, click *OK*. Finally, select *Options•Display*, make sure the *Rulers* box is checked, and click *OK*.

4. Next, click the *Text* tool (the button marked *ABC*) and drag the mouse to create a text box. Then enter your text.

5. Now comes the fun part. Select *Effects•Quick F/X* to display a list of special effects. You can see what an effect will look like by clicking it and

then checking the result in the dialog box's preview window. (To create the effect in the figure, select *Fancy embossing.*) When you've found the effect you want to use, click *Apply,* then *Close.* It may take a minute or so for Harvard F/X to complete the operation, depending on the speed of your system.

6. To finish, select *File•Exit.* Then click *Yes* at the Update prompt to return to your Harvard Graphics presentation and insert your newly embossed title in the slide. Harvard will then place the drawing in the center of the slide, but you can move it and resize it as you wish.

If you want to edit the embedded Harvard F/X drawing, use the *Select* tool (the button with the arrow on it) to select the drawing, then double-click the selection to reopen Harvard F/X and load the drawing. You can also run Harvard F/X on its own as a stand-alone application: For example, you could create drawings and save them for later use or export them in another graphics format for use in other apps. And because Harvard F/X is a full-fledged Object Linking and Embedding (OLE) server, you can use it to add drawings to other OLE clients, such as Windows word processors and desktop publishing programs.

Wall-to-Wall Labels With Publish-It

Q I use Publish-It 3.1 for Windows to print mailing labels from a database text file. I import the text into a label template, then select Text•Autoflow Text. But when I do this, the text fills the first label on page 1, then jumps to page 2 and fills in all the labels there—leaving the rest of the first page empty. I could fill in the labels on the first sheet manually, but can't Publish-It accomplish this for me?

Marilyn A. Davis, Key Largo, Florida

A I've found a shortcut that does what you want. It may be unorthodox, but it's a lot easier than filling in the rest of the first page's frames one by one. Here's how:

1. Open a new document in Publish-It, using whichever label template you need. Next select the *Frame Mode* tool and click the first empty frame on the page to select it. Small boxes should surround the frame to indicate that it is selected.

2. Select *File•Import Text* and then, in the Import Text dialog box, select the text file you want to use for the labels. Click *OK* to import it. The first three or four lines of the text file will appear in the selected frame on the page.

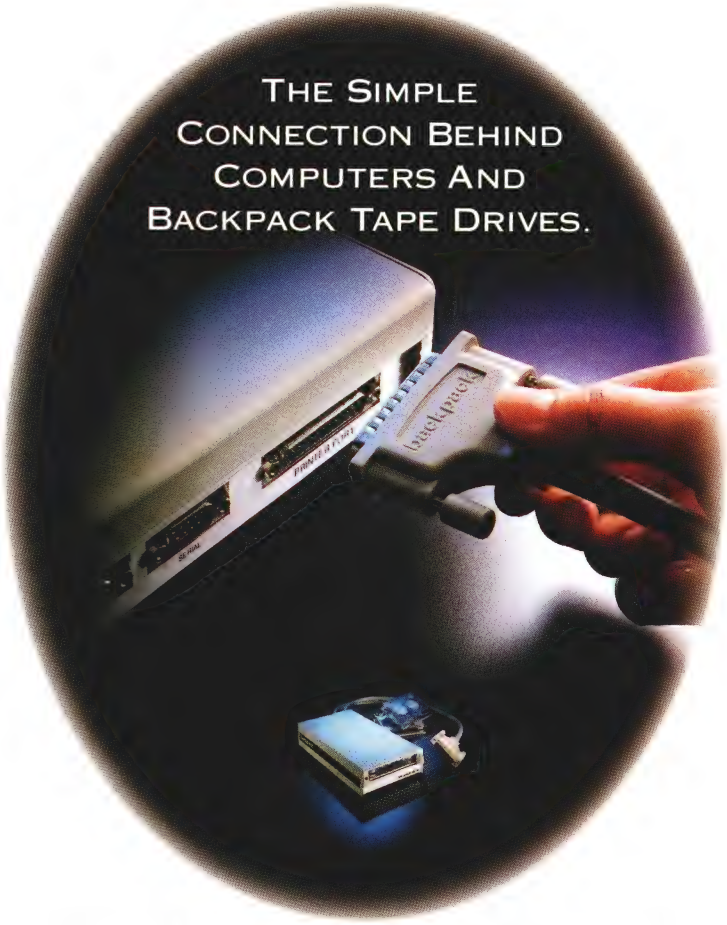
3. Choose *Text•Autoflow Text.*

4. Go back to the first page and select *Page•Delete Pages.* In the Delete Pages dialog box, with First Page to Delete set to *1,* click *OK* and then *Yes* to confirm the delete-page operation.

After Publish-It deletes that first page, the text that was on it will move to the new first page. You can now format and print your labels—without wasting a single one.

By Richard Jantz

Contributing Editor Richard Jantz is an electronic publishing and presentations consultant in Berkeley, California. Publishing & Presentations *welcomes your questions and makeover candidates. See page 12 for contact information.*



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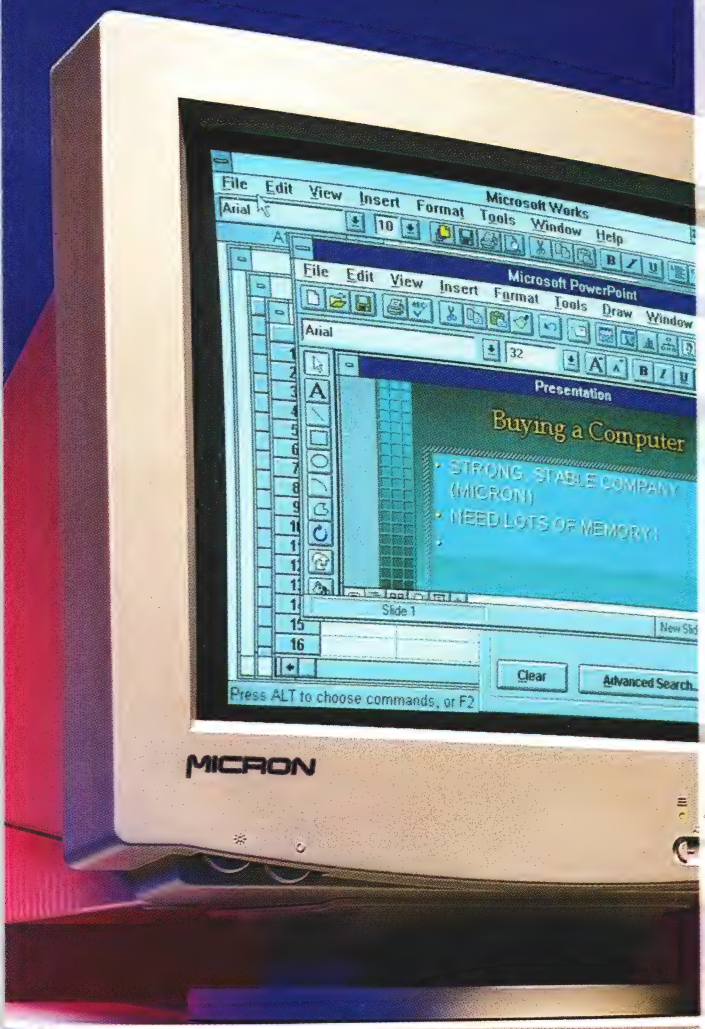

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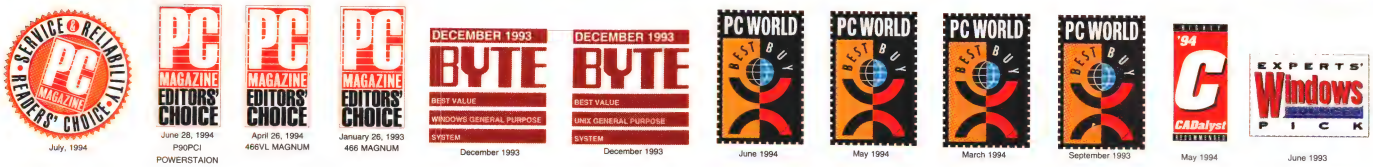

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COMMUNICATIONS Q & A

Get Modems Talking on Digital Phone Systems

Q When I'm traveling, I regularly use a modem installed in my notebook computer. But on a recent trip, I found I couldn't use the modem from a particular motel. The owners said the problem was the digital phone system they'd just installed. Is there any way to get my modem to work on phone systems like this?
Bruce L. Noren, Beavercreak, Ohio

A A modem takes the digital signals from your computer and translates them into sound pulses that can travel over traditional, analog phone systems. These days many offices and hotels are installing digital phone systems, which transmit sounds as binary electrical pulses. That means the motel's phone system was translating your modem's analog output back into digital signals. The result: Your modem can't dial.

The solution is to use an analog-to-digital adapter. These devices sit between your modem and the telephone handset or jack, converting your modem's analog signals to digital ones that can travel safely through digital phone networks. As an added benefit, these adapters protect your modem from any line surges.

One such adapter is the Konnex Konnector from Unlimited Systems. The desktop model runs $139, and the laptop version, which is about the size of a cigarette case, is $149. If you work in an office with a digital phone system, contact the phone system's manufacturer for the names of some modem adapters that work well with that system.

By the way, we'll be seeing more of these digital phone systems in the years to come. In fact, if the architects of the information superhighway have their way, all the world's telephone systems will be digital one day and modems will become obsolete. (Don't hold your breath, though. Many rural communities still have phone systems that predate The New Deal.)

- **Konnex Konnector** $139 ($149 for laptop version); Unlimited Systems; 619/622-1400
  Reader service no. 612

Stifle Windows COM Port Bullies

Q I like to leave my fax-modem and Windows-based fax software running all the time so I can receive faxes whenever they come in. But I also like to use communications programs—some of them Windows apps, others DOS based—for regular data communications. My problem is that the fax software interferes with these comm programs, forcing me to unload it before I can run another communications program. If I don't, I get the error message 'COM Port in use by another application'. Is there an alternative to unloading the fax program each time I want to use another communications package?
Richard Nelson, Santa Ana, California

A KingCom will solve your problems. It's a Windows communications-port manager that assigns a different virtual port to all your communications packages so they (and Windows) will each think they have a COM port themselves. You can run up to nine communications programs at once. KingCom works with both Windows and DOS communications programs running under Windows, and supports the major data comm and fax programs, including WinFax Pro, Procomm Plus, and Crosstalk. It also provides support for the 16550 UART chip, which can speed up transmission under both DOS and Windows communications apps.

- **KingCom** $49.95; OTC Corp., 800/769-6344
  Reader service no. 613

Turn On Your PC From Afar

Q I want to call my customers' PCs at night and turn them on remotely so I can log in and update files. Do you know of a way to do this?
Frank Scozzafava, Old Bridge, New Jersey

A Try the Remote Power On/Off Switch from Server Technology. This device will power up a PC for you when you dial in. Many users of *remote software* (communications software that lets you call into an off-site PC and run that PC remotely) find this device ideal for calling into their home or office PC. You dial in twice: The first time you signal Remote Power that you're calling; the second time the device picks up the phone and starts the PC. If your PC shares the line with a fax or voice-mail device, Remote Power will route the call accordingly.

While you're at it, you might also want to get a copy of Server Technology's LISTEN.COM utility. It loads your remote software on the host PC whenever Remote Power detects an incoming modem call. That way you don't have to keep the remote software loaded on the receiving PC all the time, hogging memory.

- **Remote Power On/Off Switch** $169.95; LISTEN.COM $15.95; Server Technology; 800/835-1515. 408/745-0300
  Reader service no. 614

By Judy Heim

Judy Heim is a contributing editor for PC World *and author of the communications section in* The PC Bible *from Peachpit Press.* Communications *welcomes your questions (see page 12 for contact information).*

USER GROUP TIP

BBS Etiquette

When you're online, write messages in upper- and lowercase letters rather than capitals, just as if you were writing to your boss. Messages typed in all-capital letters look like you're SHOUTING and are hard to read. Even typing descriptions in uppercase when you upload files is considered bad form.

Jeff Burkhardt
Idaho PC Users Group

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HARDWARE Q & A

The Best Way to Slice Drive C:

Q I recently purchased a 540MB hard disk that I need to install ASAP. I've heard it's a good idea to break down large hard drives into logical drive partitions (C:, D:, E:, and so on) to conserve disk space. What's the optimum size for a partition?

Chuck Tsuruda, San Francisco

A In your case, partitions of 127.9MB or less would waste the least space. However, most people would be willing to waste a little space rather than mess with a bunch of small logical drives. (You'd need to create five to meet the under-128MB requirement.) To decide which compromise is best, you need to understand the concept of *slack space*.

As you may know, DOS stores hard disk data in 512-byte sectors, but it monitors the status of those sectors—whether they're available, in use, or damaged—in sector groupings called *clusters*. Even if a file uses only part of a cluster, DOS registers the whole cluster as being in use, wasting the remaining unused sectors in that cluster. In fact, on average DOS wastes half a cluster of slack for every file on your hard disk.

The larger the partition size, the more sectors in a cluster—and the greater the slack space (see "Cutting Some Slack"). This bothers some people, but not me. My 340MB hard disk, configured as one big drive C:, is about three-quarters full with 2500 or so files. Each cluster contains 16 sectors (8K), so I'm wasting about 4K per file, or approximately 10MB. Sure, I could cut the amount of slack space in half by creating two 170MB logical drives (anything from 128MB to 255.9MB results in 4K clusters). But what if drives C: and D: each had 28MB left, and I needed 30MB for the full installation of WordPerfect for Windows? There's no way I could combine that disk space without a lot of tedious file shuffling to free space on one drive.

The "one big drive" method works for me. Your drive is 540MB, however, which may be a little big for that method: Partitions over 511.9MB use 16K clusters, so you'd waste a troubling 8K per file on average. Create two 270MB partitions, and you'll cut that waste in half. For an even thriftier configuration, try two 210MB partitions and a 120MB one. The two big partitions will have 4K clusters, and the little one will have 2K clusters—the smallest DOS uses for a hard disk.

Cutting Some Slack

Hard disk partition size	Cluster size	Average space wasted per 1000 files
16MB to 127.9MB	2K	1MB
128MB to 255.9MB	4K	2MB
256MB to 511.9MB	8K	4MB
512MB to 1GB	16K	8MB

LOST IN SPACE: Every file on your hard disk wastes half a cluster on average. Small hard drive partitions, with 2K clusters, minimize waste; not so 512MB partitions, with whopping 16K clusters.

DX4 Transplants

Q As I understand it, Intel has DX4 processors for 486 motherboards running at 25 MHz, 33 MHz, and 50 MHz. I have a 486DX2-66 system, which means I have a 33-MHz motherboard. Can I just swap in a new DX4 and upgrade my system to 100 MHz?

Coster Archibald, San Francisco

A No, you can't...yet. The DX4 chips that Intel supplies to PC and motherboard manufacturers won't work in your system because the DX4 is a 3.3-volt part and your CPU socket supplies 5 volts. (Besides, you'd have a tough time getting a chip; Intel doesn't sell standard DX4s to end users.) You'll have to wait for Intel's DX4 OverDrive, which should be on sale within a couple of months.

A 5-volt chip designed as an upgrade, the DX4 OverDrive is a clock tripler that should boost system performance by 10 to 40 percent, depending on the application. Why doesn't it improve performance by 50 percent, since you're going from 66 MHz to 100 MHz? First, 100 MHz is the *internal* processing speed; when the DX4 OverDrive can't find what it needs in its internal 16K cache, it must access memory at your motherboard's 33-MHz speed. Second, the big bottleneck in overall system performance is disk access, which partly offsets the increase in processing speed.

If previous Intel pricing is any guide, you should be able to buy a 100-MHz DX4 OverDrive—designed to plug into the so-called Pentium upgrade socket—for roughly $500 in stores (the list price is $749). Before you buy, call Intel's fax-back line at 800/525-3019 to get a list of systems certified as compatible with DX4 OverDrives. If your system is on the list, Intel guarantees the upgrade will work, or your money back.

How Local Is the Local Bus?

Q Most 486s come with VESA local (VL) bus slots, while most Pentiums have slots that conform to the PCI (Peripheral Component Interconnect) standard. If a 486 has a Pentium upgrade socket, does installing the upgrade change the bus from VL to PCI?

Peter Williams, Ozone Park, New York

A The *local* in local bus means anything sitting on the bus—cache memory, video controller, and so on—connects directly to the CPU. So I can see how you might think the CPU determines the *type* of local bus. Not so. The reason you haven't seen a Pentium with a VL bus is that PCI is a more recent—and more sophisticated—development. Your machine's bus type is determined by circuitry on the motherboard, so installing a Pentium upgrade

will not change the bus from VL to PCI. It won't even change the bus speed, since that's also determined by the motherboard.

Tape Drive Hype

Q I recently ordered a Colorado 250 tape drive, thinking 250MB was a lot of capacity. I was surprised to learn that this 250 drive actually uses tapes with an 80MB capacity—250MB is the maximum capacity with software compression. Other tape drive companies, and even the companies that make the tapes, similarly misrepresent capacity. How can they get away with this?
Larry Rehm, Florham Park, New Jersey

A Actually, your drive also uses 120MB tapes. The 250MB claim is based on an optimistic estimate of capacity for compressed files. These exaggerated claims bug me, too. Capacity with compression depends on file type; you'll actually get anywhere from *no* compression on already-compressed files to 4:1 on some graphics files. With my setup, I can usually pack about 200MB of data on a 120MB tape. Fortunately, this sort of compression is safe and has a minimal effect on backup speed unless you're using a very slow system.

The real issue is cost. Drives like your Colorado 250 cost about $200 and use tapes that run as low as $20 to $25. Because these drives use your floppy controller, you generally won't have to buy a separate interface, as you would with pricey SCSI DC2000, DC6000, or DAT drives—all of which deliver much higher performance and capacity. (See the review of DC2000 tape drives in "Back It Up!" in this issue.)

Paintbrush Blues

Q I find that a mouse doesn't make a very good drawing or painting tool. I would prefer to use a stylus and some kind of drawing pad. Any suggestions?
Leanne Riding,
Vavenby, British Columbia, Canada

A If you're willing to spend some money, try a digitizing tablet. Usually employed in CAD applications, these devices have a *puck* (a clear plastic drawing tool with cross hairs) for extremely precise drawing. But if you're just drawing or painting for fun, you're probably better off with an inexpensive graphics pad, which comes with a stylus and does the same thing with less precision. One of the best deals I've heard of is the Acecat II, a 5-by-5-inch graphics pad (with stylus) that sells at Egghead Software for a little over $100. If you're more serious about art, you can pony up the big bucks for a pressure-sensitive pad, which varies line width and quality in a lifelike way as you bear down on or ease off of the stylus. The ArtZ Serial from Wacom Technology is a popular model and retails for $499.

- **Acecat II** $129; Acecad; 800/676-4223, 408/655-1900
  Reader service no. 610
- **ArtZ Serial** $499; Wacom Technology Corp.; 206/750-8882
  Reader service no. 611

By Eric Knorr

Eric Knorr is a contributing editor for PC World. Hardware *welcomes your questions* *(see page 12 for contact information).*

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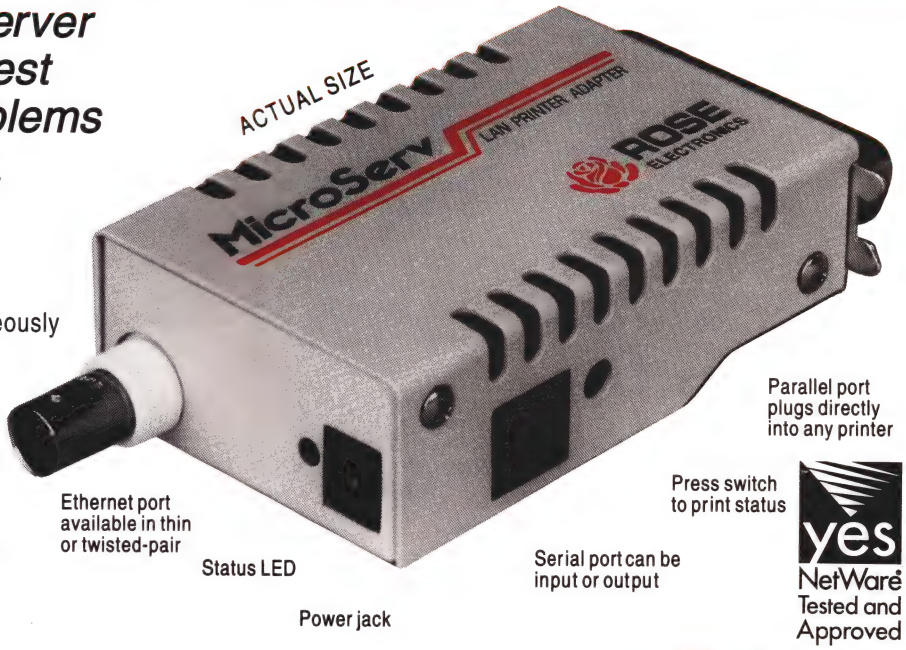

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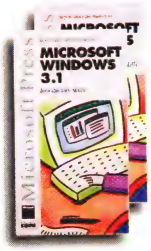

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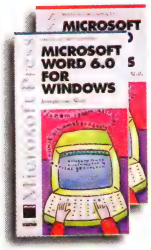

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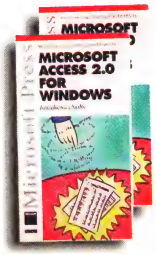

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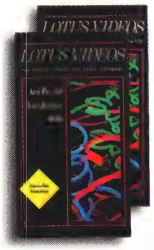

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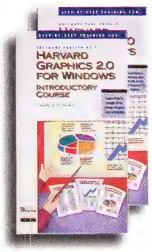

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STAR-DOT-STAR TIPS

Canny CONFIG.SYS Comments

MS-DOS 6.0 and later versions implement a very useful but undocumented CONFIG.SYS command that consists of the keyword COMMENT followed by one or two characters. You can use these characters to add nonexecuting text to any CONFIG.SYS command that follows them; DOS and device drivers will ignore anything after the characters. For instance, placing the statement COMMENT// at the beginning of CONFIG.SYS will let you embed C++-style comments such as LASTDRIVE=Q //Use letters up to Q.

Dave McBride, Atlanta

Editor's note: This undocumented but useful command lets you tag individual CONFIG.SYS lines with explanatory comments—handy if you've got a huge CONFIG.SYS file with multiple configurations. It's especially helpful if, like me, you've installed a memory manager that adds cryptic memory load address instructions to each CONFIG .SYS line, making it hard to tell what each command does.

When I looked for additional information on COMMENT, I did not find any recent article, in any computer magazine, that mentioned this feature. I searched over a dozen volumes on my shelves before I finally located it in Geoff Chappell's book *DOS Internals* (Addison-Wesley, 1994).

According to Geoff, the COMMENT command lets you designate almost any character or pair of characters as a "comment indicator." But be careful what characters you choose. If you pick a combination that actually crops up inside a real command—say, letters of the alphabet—it can wreak havoc when you boot. Two hyphens (--), the comment symbol from the Ada language, is a good choice; so is a double slash (//), one of the comment symbols from C++. Chappell, who has apparently disassembled most of MS-DOS, says you can't use a tab, a carriage return, a linefeed, a space, or an equal sign in comment indicators, but you *can* use an equal sign as the second character.

```
@ECHO OFF
IF "%1"=="A" GOTO ADRIVE
IF "%1"=="a" GOTO ADRIVE
IF "%1"=="B" GOTO BDRIVE
IF "%1"=="b" GOTO BDRIVE
GOTO FAIL
:ADRIVE
ECHO L 100 0 0 1 > SNO.SCR
GOTO CONTINUE
:BDRIVE
ECHO L 100 1 0 1 > SNO.SCR
:CONTINUE
IF "%2"=="" GOTO WIPE
ECHO E 126 29 >> SNO.SCR
ECHO E 127 %5 %4 %3 %2 >> SNO.SCR
GOTO FINISH
:WIPE
ECHO F 126 l 5 0 >> SNO.SCR
:FINISH
IF "%1"=="A" ECHO W 100 0 0 1 >> SNO.SCR
IF "%1"=="a" ECHO W 100 0 0 1 >> SNO.SCR
IF "%1"=="B" ECHO W 100 1 0 1 >> SNO.SCR
IF "%1"=="b" ECHO W 100 1 0 1 >> SNO.SCR
ECHO Q >> SNO.SCR
DEBUG < SNO.SCR > NUL
DEL SNO.SCR
IF NOT "%2"=="" ECHO New VSN: %2%3-%4%5
IF "%2"=="" ECHO VSN wiped.
GOTO END
:FAIL
ECHO USAGE: SN DRIVE XX XX XX XX
ECHO Where XX is a hex numeral
ECHO Omitting XXs sets SN to 0000-0000
:END
```

FIGURE 1: CHANGE OR CLEAR floppy volume serial numbers using SN.BAT, which creates a debug script from your input.

Eat Your Serial (Number)

The March *Help Line*, "Serial Sanity," mentioned that each disk formatted by recent versions of DOS and OS/2 is imprinted with a volume serial number (VSN). Here's a batch file [**FIGURE 1**] that uses DEBUG to write a new VSN to a floppy or wipe out the existing one.

Jerry Spillman, Arvada, Colorado

Editor's note: This batch file builds and then executes a DEBUG script that alters a floppy's VSN. To set the VSN to zeroes, issue the command **SN A** (or **SN B** if the floppy disk is in drive B:). To set the VSN to a specific hex number, follow the drive letter with that number, one byte at a time. For example, the command **SN B 04 03 02 01** sets the VSN to 0403-0201. I've modified this batch somewhat to make it simpler and more foolproof, but it still has limited error checking. If you enter something other than hex numbers for the bytes of the new VSN, you could get odd results, so be careful.

WordPerfect Watches Your Spelling

In the March review "Windows Word Processors: Wizards Versus Coaches," George Campbell complained that WordPerfect, unlike Word for Windows, doesn't offer automatic spelling correction (the capability to fix misspelled words as you type). In fact, WordPerfect 6.0 for both DOS and Windows provides a little-known feature that can do much the same thing when you spell-check documents, without the performance degradation of Word for Windows' on-the-fly correction.

Here's how to use it in WordPerfect 6.0 for DOS. Select *Tools•Writing Tools•Speller•Edit Supplemental Dictionary* (or press**<Ctrl>-<F2>6**). Next, choose *Add* to append a new word to the dictionary. Select *Word/Phrase with Replacement* to enter a common misspelling of a word and its automatic

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A. Monthly Calendar • A monthly calendar is shown with the number of appointments for each day shown on the corresponding day

B. Appointment List • A list of the times and appointments for the selected day on the monthly calendar is shown

4. Goals

A. Long term Goals • A register showing your long term goals is shown. Clicking on any goal in that register will pull up all information about the goal including expected completion date, and steps to complete the goal. You may add, edit or delete goals

B. Short term Goals • Same as for long term goals

C. Relationship Goals • A name register taken from the people database will show a list of goals for the person selected. Goals can be added, deleted and edited for each person in the people database. Goals also includes the expected completion date and a "What I Can Do to Help" comment box.

5. Travel section

• Quick access travel information will be stored. The company name, and telephone number will be stored for airlines, hotels, trains, travel agencies, rental car agencies, and misc. ways of travel.

6. Gift Section

• Different categories of gifts will be shown, such as flowers, clothing, jewelry, gourmet foods, travel packages, gift certificates, sporting goods, electronics, music, etc.

7. Ideas/Projects

• Allows user to define multiple topics, people involved in these topics,the ideas associated with them and expected completion dates.

8. Family Activities

• Lets people keep track of family activities that they have had and helps them schedule future activities

9. Proposals

• Templates of different types of business letters, including proposals, contracts, and templates of resumes and fax-cover sheets

10. People

A. People Information • A screen to add, update and view specific information about a person including name, address, phone, birthday, anniversaries, spouse, children, associated people, gift register, relationship register, company name, etc.

B. Upcoming Events • Upcoming events in the lives of people are shown as well as upcoming holidays • Different categories of events can be shown, such as all birthdays, weddings, anniversaries, special events and holidays

C. Holidays • A listing of major holidays are personalized by deleting uncelebrated holidays, adding personal holidays, or adding personal messages on a specific date

D. Search • Search different groups or companies to find people by classification, gender, priority, or type of entry

E. Interest • Look at people's interests from a list of editable interest boxes. Store information on favorite places, food, collectables, sports teams, musical instruments.

11. Tools

A. Billing Timer • Enter Client name and reason for billing • Enter billing rate by hour or minute • Set maximum and minimum charges • Select currency symbols • Transfer information to an invoice & a receivable ledger. **Also includes: Alarm Clock, Calculator, Auto-Dialer, and Conversions Tool**

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USER GROUP TIP

Quick Saves in Quicken

To force Quicken for Windows to update all its data files, press <Ctrl>-B (for backup), then press <Esc> when the dialog box appears. Confirm that Quicken has updated its files by opening File Manager and checking the dates on the data files.

Clint Tinsley
Idaho PC Users Group

replacement. If there is more than one likely replacement, choose *Word/Phrase with Alternates* to enter the misspelled word and a list of choices to appear when the spelling checker encounters the error.

In the Windows version, the technique's a bit different. Press **<Ctrl>-<F2>** if you've selected the DOS keyboard mapping, or *Tools•Speller* if you're using the default Windows keyboard mapping. Choose *Add* to append a new word to the dictionary. Select *Replacement* to enter the misspelled word and its replacement. If there is more than one possibility, choose *Alternatives* to enter the misspelled word and a list of choices that pops up during spelling checks.

Suppose, for example, I frequently type the word *the* as *hte* or *eth*. Using the replacement option, I can set the spelling checker to always replace *hte* with *the* without prompting. But I don't want to do this with *eth*. I study medieval literature, and *eth* is the name for the letter ∂ used in Middle English. So I choose the Alternatives option, and when Speller encounters *eth* it asks if I want to replace it with *the*, or anything else I add to the list.

Robert Duncan, Saskatoon, Saskatchewan

Editor's note: Both the DOS and Windows versions of WordPerfect 6.0 give you a great deal of control over the spelling checker. They're the only programs I know of that let you specify the list of alternatives for a particular word. (Most others list any dictionary entries that, according to the spelling checker's matching algorithm, are close to what you typed.) The automatic replacement option is almost as convenient as on-the-fly correction, as long as you remember to run the spelling checker before printing the document. Given Windows' already slow speed on many systems, I too prefer batch spelling checks.

Slick Windows Setups

When you install a Windows application, the instructions almost always tell you to insert the first floppy into A: or B:, then use the File•Run command in Program Manager to start the installation. But if you install a lot of Windows software, this procedure gets old. Here's an easy solution.

In Program Manager, select *File•New*. The New Program Object dialog box appears. Click *OK* to create a new item, and the Program Item Properties dialog box appears. Enter **Setup from A:** in the Description field, **A:\SETUP** in the Command Line field, and the path of your Windows directory (usually **C:\WINDOWS**) in the Working Directory field. Click the *Change Icon* ▶

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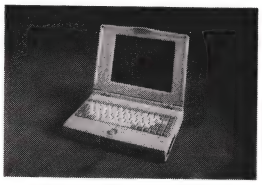

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button (ignoring any error message you may get if there's no disk in the drive) and pick an icon that evokes setting things up (you'll find several good ones in PROGMAN.EXE and MORICONS.DLL). Finally, click *OK*. If you don't have a floppy disk in the drive for which you're creating the setup icon, additional error messages will appear. Don't worry; just click the *OK* and *Yes* buttons.

When you're done, you have an icon for setting up a new program from A:. You can use the same process to create icons for A:INSTALL, B:SETUP, and B:INSTALL.
Noah Dee, Denver

Editor's note: It's a great idea to create icons that perform commonly repeated tasks. I spend a lot of time reviewing software, so starting setup programs is one of the most common things I do in Windows. I have even assigned Program Manager hotkeys (<Ctrl>-<Shift>-A and <Ctrl>-<Shift>-B) to my icons for immediate access. If you manage even a few computers, you will probably want to do the same.

Press <Ctrl>-P to Print

I have found a simple way to print an entire hard disk's directory. Press **<Ctrl>-P** at the DOS prompt, then type **DIR /S** and press **<Enter>**. This sends the directory to your printer. Press **<Ctrl>-P** again when you are done, to stop sending output to the printer.
Mike Gillespie, America Online

Editor's note: This is just one use for the little-known (and rarely discussed) <Ctrl>-P toggle. This command is not documented in most DOS manuals, and a quick search of back issues shows that even *PC World* hasn't mentioned it in at least two years. Believe it or not, <Ctrl>-P has been available since MS-DOS 1.0. A holdover from the days of the ancient CP/M operating system, <Ctrl>-P instructs CON—DOS's built-in console device—to copy everything it writes on screen to the printer.

You could also send a directory of the entire disk to your printer by using redirection—that is, by entering the command DIR /S > PRN—but <Ctrl>-P offers some advantages. First, it can keep a record of everything you type as well as everything DOS writes to the screen, making it easy to create DOS sessions logs. And it will send the output of any DOS command to the printer, whether the output of that command can ordinarily be redirected or not. <Ctrl>-P won't work within an application program, however, unless the application uses DOS's console device to write to the screen. If the application (like most programs) uses the BIOS, or writes directly to screen memory, it bypasses CON.

Clarification

Several readers have written, in response to an item in the May *Star-Dot-Star* column, that it is indeed possible to place a space in the middle of a file name or volume label. But according to Microsoft, while some software can create file names with spaces, the spaces aren't legal and can cause software problems. Likewise, volume names with spaces, while they can be created by some versions of DOS utilities, can cause compatibility problems and may not be written to the disk as you typed them. Microsoft now warns against using spaces in volume names, and has programmed the Windows File Manager to reject attempts to create volume names with embedded spaces. We recommend you avoid spaces in volume names. Instead, use ASCII code 255 (**<Alt>-2-5-5**), which appears as a blank space when written to the screen.

By Brett Glass

Brett Glass is a contributing editor for PC World. Star-Dot-Star *welcomes your tips, macros, batch files, and short programs (see page 12 for contact information).*

POWERTIP no. 308

Stacking Commands With DOSKEY

DOS's DOSKEY can execute multiple commands from a single command line if you press <Ctrl>-T, which displays as a paragraph mark, between commands. Load DOSKEY by entering DOSKEY at the command line (or insert it in your AUTOEXEC.BAT so it loads when you boot your system) and then enter your commands. Use as many commands as you want, as long as their combined length doesn't exceed 127 characters, the DOS command line limit. Press <Enter> and the commands will execute in sequence.

Ken Johnson
Oak Park, Illinois

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Micro-Scope is a universal PC diagnostic that runs a proprietary O/S which eliminates DOS limitations and inaccuracies. Ver.5.0 adds 125 enhancements and includes: IDE low-level format, accurate IRQ conflict display, cache memory test, 2 meg video memory test, data recovery capabilities, virus capabilities, and more!

Post-Probe is a universal P.O.S.T. reader card for the non-bootable PC. Post-Probe includes: MCA adapter, tri-state logic probe, 13 LED pre-post test, 7 segment post code display, and a manual with a full explanation of the manufacturer post codes down to the device or chip failure.

Micro 2000

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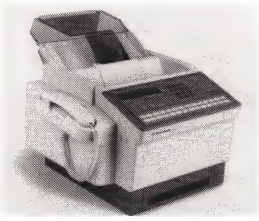
Glendale, CA 91205
TEL: (800) 864-8008
FAX: (818) 547-0397

CIRCLE 457 ON READER SERVICE CARD

INSTANT INFORMATION

PC WORLD Fax-On-Demand System

Advertisers can now provide instant product information and/or price quotes to prospects through PC World's totally automated **Fax-On-Demand system.** Advertisers simply add a PC World 800 number with a unique extension number to their ads. Readers with a touchtone phone access your extension and are guided through a menu. Requested information is then immediately faxed. Leads can be pre-qualified and profiled, with follow-up material or research surveys sent automatically at specified intervals.



For more information on PC World's Fax-On-Demand System, contact your PC World advertising sales representative, or call our Interactive Fax-On-Demand System.

PCW INFO HOTLINE: INSTANT FAX BACK
1-800-234-0455 ext. 117

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FAX: (719) 676-4012

CIRCLE 449 ON READER SERVICE CARD

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For more information on selling products by advertising in PC World Action Cards, please call:

PC World
Action Card Sales Department

501 Second Street
San Francisco, CA 94107

Eastern U.S.: 508-820-8113
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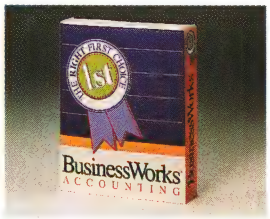

Manzanita Software

2130 Professional Drive,
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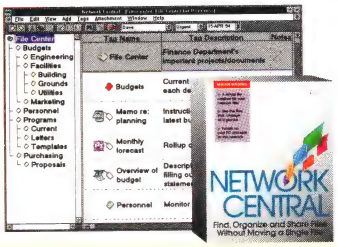
CIRCLE 520 ON READER SERVICE CARD

Now You Can Find And Share Files Without Struggling With The Network.

New Network Central.™ This is the way your network is supposed to work.

Network Central for Windows is simply the fastest, easiest way to find, organize and share documents, spreadsheets and files, on your network. All without moving a single file or fighting your way through network complexity. It's designed to be installed by you and used on your PC without interfering with the network. It's a powerful single user tool *and* a real productivity enhancer for any team.

Find. Once you find a file you never have to look for it again, because with Network Central you get back to it with a single click. You can also preview file contents without opening the file itself.



Organize. Simplifies project organization by creating a *virtual file cabinet* for your network. A single location where you or your team can organize project files into folders without moving them from their original locations.

yes It runs with NetWare

Share. Makes file sharing easy because Network Central gives you one place to find all the files you need. Even new team members have instant access to project files. Plus it automatically navigates the network for you, even if you're not connected to the drives or servers where the files are located.

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Add users. As your need to share files grows, Snap+Together™ design lets you easily add new users one at a time.

Network Central. The most powerful tool ever created for finding, organizing and sharing files. For more information or to order, call today. We'll make your network work for you.

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AND GET A BONUS LICENSE TO USE WITH A FRIEND FREE.

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FIRST FLOOR

001

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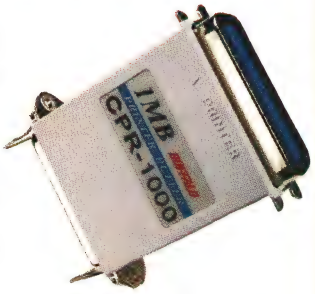
POWER PRINTING - 150,000 cps

Plug the BuffPort™ into your PC and print to any parallel printer or device. Transfer data from your PC as fast as the printer can accept it, up to 150,000 cps. (A standard PC parallel port is typically limited to about 10,000 cps.) Use the BuffPort with the HWP for a 150,000 cps printer sharing system!

If you have an older printer that does not have an high-speed interface, then connect a CPR buffer to the end of your printer cable and send from the BuffPort at 100,000 cps. The CPR also works as a printer buffer with a standard PC parallel port, but would be limited to the PC port's speed.



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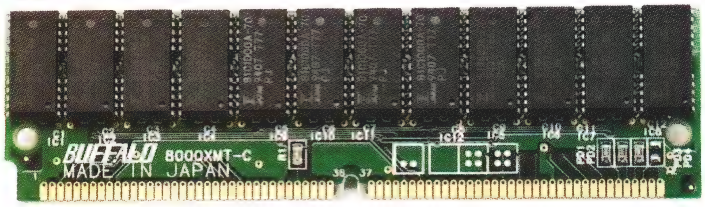
SIMMs:
1 x 36 & 32
2 x 36 & 32
4 x 36
4 x 8, 1 x 3
PCMCIA



Printer Sharing:

SL	6 ser. & 4 par.
SLP	2 ser. & 8 par.
HWP	5 parallel ports
HXM	2 ser. & 2 par.
HXS	4 serial ports
ASB	5 parallel ports

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1MB×9	$ 42	$ 45	$ 55
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1×36 (4MB)	$159	$ 169	$ 189
2×32 (8MB)	$329	$ 339	$ 389
2×36 (8MB)	$339	$ 349	$ 389
4×32 (16MB)		$ 649	$ 699
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KŌNEXX

KŌNEXX KONNECTOR – PORTABLE, MODEL 112

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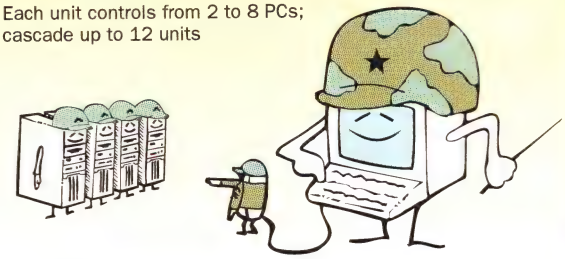

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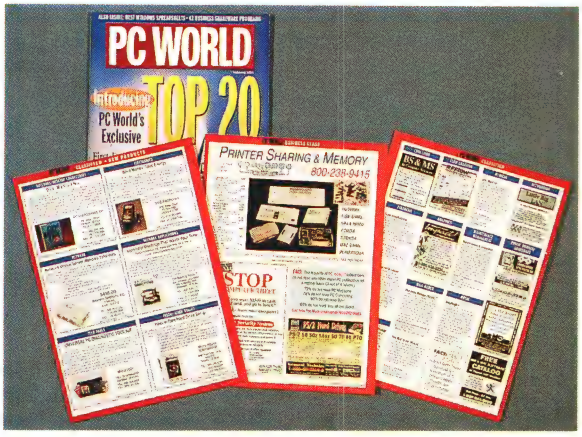

It's no secret anymore. *PC World's* "Classified Section" has become one of America's most successful selling platforms for hardware and software. Reader responses for the last twelve months have averaged 350 replies per ad, per issue. And the price is remarkably affordable. A 3 inch x 1 column ad only costs $1680 at the 12-time rate. So figure it out: if your ad just pulls the typical response of 350 inquiries, can you afford NOT to advertise in *PC World?*

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with the Kablit™ Sentinel's Dual Security Features:

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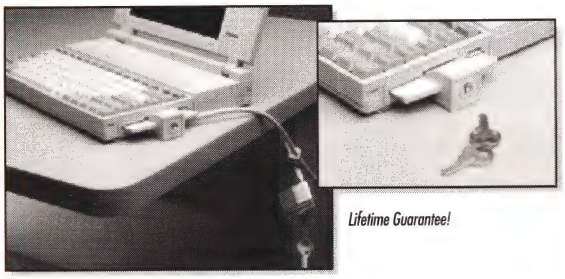

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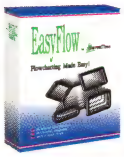

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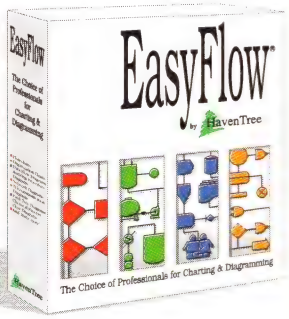
It's here for Windows™



If you didn't wait
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- 81% determine the need for products & their features
- 85% suggest, evaluate or recommend specific brand models
- 55% make the final buying decision

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CIRCLE 484 ON READER SERVICE CARD

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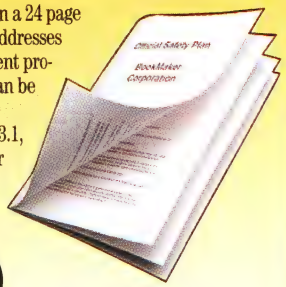

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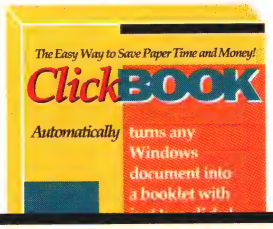

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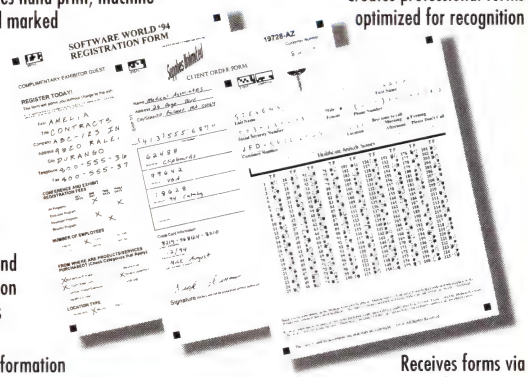

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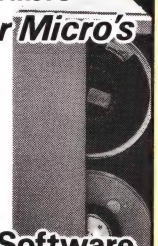

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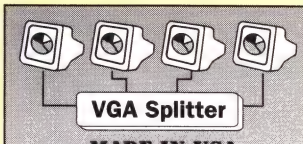

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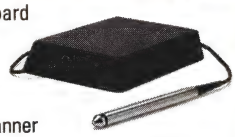

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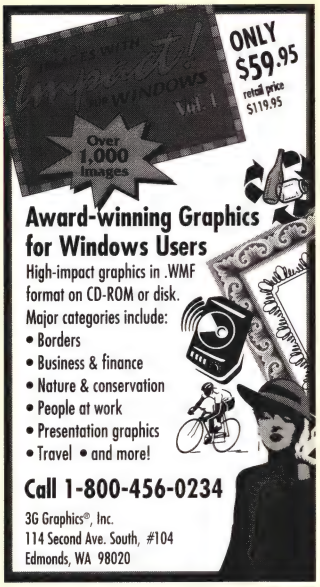

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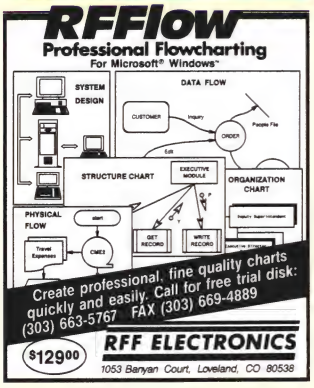

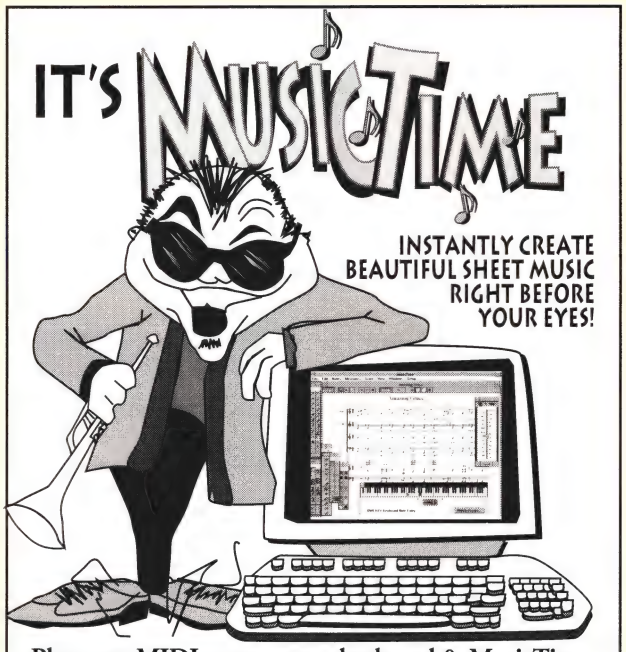

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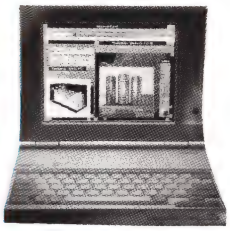

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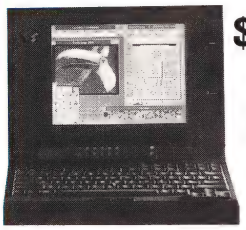

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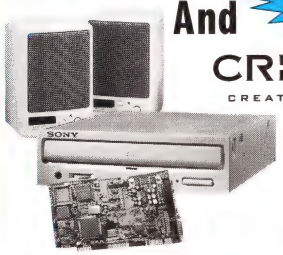

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20" GDM2036S/GDM2038	$1949/$2069
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ATI Technologies

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KELVIN 64 1MB ISA/VLB/PCI	$175
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HAYES

	Int./Ext.
PCMCIA Optima 144 + Fax	$289
ACCURA 24	$69/$75
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Optima 144+ fax144	$369/$379
Optima 144+ fax Pocket Ed.	$299

US ROBOTICS

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14.4K with Fax	$119/ $149
Pocket 24/96 Data/Fax	$69
Pocket 14.4K with Fax	$189

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ActionNote 4SLC2-50 120MB W/Modem	$1429
ActionNote 4SLC2-50 180MB	$1429
ActionNote 4SLC2-50 180MB W/Modem	$1529
ActionNote 500C 180MB W/Modem	$2039
ActionNote 700 120MB/210MB	$1859/$1929
ActionNote 700C 210MB	$2549
ActionNote 700Cx 210MB	$3199

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T1910/1910CS 200MB	$1499/$2049
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T4700CS 200MB/320MB	$3129/$3359
T4700CT 200MB/320MB	$4579/$4899
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T6600C, C/CD	$6129/$6599

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WinDX2/40 Pass. Color 200MB	$2099
WinDX2/50 Dual Scan Color 200MB	$2349
WinDX2/50 Act. Matrix Color 200MB	$2849
WinDX2/75 8.4"Active Matrix Color 340MB/455MB	$3599/$3929
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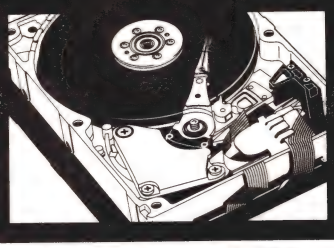

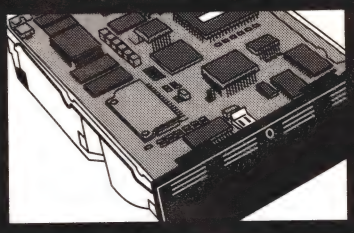

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540MB Drive, Local Bus Cache card	$478
1Gig Drive, GSI-21 accelerator card	$759
1Gig Drive, GSI-21, 250MB Tape, 4 tapes	$899

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1Gig Drive, 32Bit Local Bus	$889
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1.7Gig Drive, Local Bus Cache Card	$1239
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printer port with 1 cartridge	$399 / $619	External for MacIntosh & 1 Disk	$399 / $629

gsi GSI drive accelerators increase the data transfer rate of your IDE drive 30 to 80%. Works by enabling the drives Read Multiple & Write Multiple commands to greatly increase performance. We highly recommend these products for WD, Conner, Quantum, Seagate, Micropolis, Maxtor, & Fujitsu.

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GSI-21 Board supports 2 IDE, 4 floppy drives. Doubles QIC-80 tape drive speed	$65	$55
GSI-18 Board supports 2 IDE drives. Works in conjunction with MFM, RLL, etc.	$55	$45
GSI-32 Board same as -21 adds 2 16550 serial ports & 1 bi-directional parallel port	$139	$119
GSI MaxIDEA Software solution works on existing IDE configuration (requires less than 1K of memory). Includes performance benchmark test.	$34	$25

HARD DRIVES

CONNER

IDE			
210MB	14ms	CFS210A	$202
340MB	13ms	CFA340A	$261
420MB	14ms	CFS420A	$269
541MB	12ms	CFA540A	$374
1060MB	9ms	CFP1060A	$729
SCSI			
1060MB	9ms	CFP1060S	$719

Maxtor

IDE			
245MB	15ms	7245A	$249
345MB	14ms	7345A	$259
540MB	12ms	7546A	$358

MICROPOLIS

IDE			
1050MB	10ms	MC4110A	$725
1740MB	10ms	MC2217A	$925
SCSI			
1052MB	8.5ms	MC4110	$725
1740MB	10ms	MC2217	$925
3020MB	11ms	MC1936	$1999
SCSI-AV Audio / Visual tuned drives			
1000MB	10ms	MC2210AV	$795
1700MB	10ms	MC2217AV	$999
3000MB	11ms	MC1936AV	$2119

Seagate

IDE			
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260MB	16ms	ST3290A	$219
341MB	13ms	ST3391A	$267
540MB	12ms	ST3655A	$370
SCSI (WIDE SCSI also available)			
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2145MB	8ms	ST12550N	$1639
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341MB	12ms	AC2340	$250
425MB	12ms	AC2420	$275
540MB	11ms	AC2540	$359
730MB	10ms	AC2700	$529
1083MB	10ms	AC31000	$739

HARD DRIVES

Quantum

IDE			
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270MB	12ms	LPS270A	$229
342MB	12ms	LPS340A	$269
541MB	12ms	LPS540A	$359
SCSI			
170MB	14ms	ELS170S	$199
270MB	12ms	LPS270S	$245
342MB	12ms	LPS340S	$272
541MB	12ms	LPS540S	$389
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digital

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35 & 40	$269	$369	$469
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ADAPTEC	Alone	w/Drive
A1522BASIC 16Bit SCSI	$129	$109
A1542CBASIC 16Bit SCSI	$225	$215
A2742 EISA SCSI	$389	$369
A2842 VESA SCSI	$319	$299
FUTURE DOMAIN		
1680SVP 16Bit SCSI	$155	$139
QLOGIC		
VESA SCSI	$225	$209
PCI SCSI-2 and WIDE SCSI	$325	$309
ALPHA RESEARCH CACHING CARDS		
S425I 16Bit IDE	$99	$89
S475I 32Bit Local Bus IDE	$139	$129
S485I 32Bit PCI IDE	$229	$219
S425S 16Bit SCSI	$229	$219
S475S 32Bit Local Bus SCSI	$369	$359

Many other types of controllers in stock.

CD ROM DRIVES

NEC	CDR900	4X	180ms	$979
NEC	CDR510	3X	195ms	$389
Toshiba	XM3401	2X	200ms	$315
Toshiba	XM4101	2X	320ms	$219
Sony	CDU561	2X	295ms	$289
Teac	CD50	2X	265ms	$259

Pioneer External CD Changers (300ms)

DRM602X	6 disc	307KB/sec	$869
DRM604X	6 disc	612KB/sec	$1149
DRM1804X	18 disc	612KB/sec	$2059

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SCSI Drive, sound card (in retail pkg)

MV=Media Vision Pro Audio 16. MS=Media Vision Pro Studio 16 SB= Sound Blaster 16 SCSI. SA= Sound Blaster SCSI ASP.

	MV	MS	SB	SA
XM4101	$330	$350	$400	$430
CD50	$399	$429	$449	$489
CDU561	$429	$459	$469	$519
XM3401	$435	$455	$505	$535
CDR510	$509	$539	$579	$609
CDR900	$1119	$1149	$1159	$1199

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CD ROM Drive Towers - Multiple CD ROM drives in a single external enclosure. Great for networks, BBS, or business.

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CD50	$649	$1389	$2479
CDU561	$699	$1479	$2639
XM3401	$789	$1659	$2999
CDR510	$939	$1999	$3499
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SCSI Tape Drives - Kits include 16bit card, software & 1 tape			Bare	Kit
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2Gig	Conner	4320	$799	$969
2Gig	HP	35470	$929	$1049
4-8Gig	Conner	4324	$1119	$1329
4-8Gig	HP	35480	$1059	$1279
4-16Gig	Sony	SDT5000	$1099	$1299
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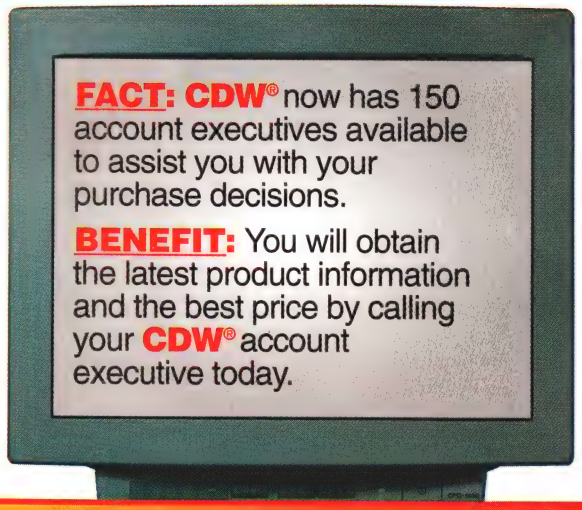

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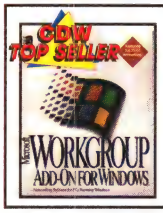

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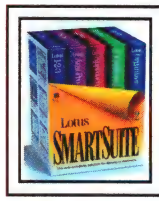

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LC 4/66D 270MB ....1858.18 MT P60 540MB CD 3229.48
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NOTEBOOK 80MB MONO 1592.15
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Canon NoteJet notebooks

4/33 120MB mono ....1899.98 4/33 200MB pas clr 2577.43
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INNOVA NB 4/33S 120MB MONO 1543.86
INNOVA NB 4/33 170MB MONO 1613.78
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ActionNote 4SLC50 120MB+modem 1442.05
ActionNote 4SLC50 180MB+modem 1493.04
ActionNote 500C 120MB+modem 1782.87
ActionNote 500C 180MB+modem 1963.08
ActionNote 700 120MB mono 1988.16
ActionNote 700C 120MB pas clr 2464.25
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ActionNote 700CX 210MB act clr 3197.84

IBM ThinkPad Portables

350 125MB mono ....1499.00 350C 250MB pas clr 2199.00
350 250MB mono ....1899.00 500 4/50D2 85MB 1399.00
350C 120MB pas clr ....1799.00 500 4/50DX2 170MB 1699.00

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4/33DX Si 120MB ....1309.00 4/50DX2 MT 420MB 2159.00
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NEC VERSA NOTEBOOKS

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4/40 250MB Color ....3817.65 4/75 340MB Color 5138.10
4/50 209MB Color 4171.52
READY 4/33S 210MB Multimedia 1458.26
IMAGE III 4/50 210MB 1719.00
IMAGE III 4/50 420MB 1807.48
POWERMATE 4/33SX 170MB 1129.54
POWERMATE 4/50DX2 210MB 1388.27
POWERMATE 4/66DX2 210MB 1727.72

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Force 4/33SX 210MB 849.00
Force Multimedia 4/33SX 340MB 1338.58
Force Multimedia 4/50SX2 420MB 1549.47
Force Multimedia 4/66DX2 420MB 1979.25
Force Multimedia 5/60 420MB 2405.05
Force 4/50SX2 340MB 1178.39
Force 4/66DX2 420MB 1549.47
Force MT 4/66DX2 420MB 1729.70

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TM4000M 4/25 120MB mono 1997.95
TM4000M 4/25 120MB adv pas clr 2347.46
TM4000M 4/25 200MB active clr 3197.00
TM4000M 4/75 344MB active clr 4947.42
TM4000E SX/25 120MB adv clr 1827.22
TM4000E DX2/50 200MB dual clr 2727.00
TM4000E 4/50 200MB active clr 3347.23
TM4000E DX4/75 340MB active clr 4223.94
TM4000E DX4/75 455MB active clr 4947.32

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184 TURBO ....219.14 ML590 ....429.51
ML320 ....304.45 ML591 ....585.87
ML321 ....432.43 Pacemark 3410 ....1222.92
ML380 ....214.95 OL400E 499.98
ML395 ....989.32 OL410E 649.31
ML395C ....1039.74 OL810 ....905.50
ML520 ....369.82 OL830+ 1079.11
ML521 ....495.18 OL850 PS 1199.20

Canon

BJ10SX * ....214.88 BJC600 Color* 535.00
BJ200E* ....254.00 LBP430 Laser* 558.50
BJ230* ....358.00 600DPI 8PPM* 1268.57
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AP3250 ....159.95 LQ2550 ....898.08
AP3260 ....177.75 DFX5000 Plus 1328.75
LX300 ....168.56 DFX8000 ....2247.45
FX870 ....267.59 Stylus 300 ....199.54
FX1170 ....352.95 Stylus 800 ....274.20
LQ570+ ....237.97 Action Laser 1500 ....656.70
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LQ870 ....441.91

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4029-10 10PPM 1115.42
4039-10R 10PPM 1277.46
4039-10RD 10PPM DUPLEX 1747.77
4039 16L PLUS 2697.44
4039 12L PLUS 1847.57
4039 12R PLUS 1397.57
WinWriter 600 ....1177.38

NEC

SuperScript 610 ....477.78
Silentwriter 640 ....788.58
Silentwriter 1097 ....1377.60

Panasonic

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2023 ....182.27 3123 NEW 249.00
2123 ....243.37 4410 LASER 547.15
2124 ....318.41 4430 LASER 686.91
2130 new ....203.80 4440 LASER 1019.76

TEXAS INSTRUMENTS

MICROMARC INKJET 277.01
MICROMARC COLOR INKJET 379.13
MICROWRITER BASIC 507.16
MICROWRITER PS23 ....677.22
MICROWRITER PS65 ....937.20
MICROLASER PRO 600 PS23 ....1355.20
MICROLASER PRO 600 PS65 ....1524.25
POWERSTEP UPG- mL600 ....274.68

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SHARP JX9460PS 600DPI 6PPM 945.75

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HP DeskJet 560C 568.00
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HP DeskJet 1200C PS 2095.47
HP PaintJet XL300 ....2258.93
LaserJet 4L 669.56
LaserJet 4P 958.00
LaserJet 4MP 1469.89
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452MB IDE 331.16

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Caviar 340MB IDE 279.54

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ACCULOGIC IDE W/BIOS 48.90
ACCULOGIC VLB IDE 89.76
ADAPTEC 1510A SCSI-2 CD KIT 89.86
ADAPTEC 1542CF SCSI-2 ....265.45
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Promise IDE ISA Cache 99.88
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OPTIMA 28.8K V.FC W/FAX EXT 439.13
ULTRA 9600 EXT 569.18
ULTRA 14.4 EXT 645.20
ESP Accelerated Single/Dual Serial 79.24/121.12

PRACTICAL PERIPHERALS

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9600 Mini Tower w/FAX 117.10
14.4 int w/FAX 107.83
14.4 Mini Tower w/FAX 127.83
28.8 int w/FAX 227.23
28.8 Mini Tower w/FAX 244.26

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400 INT 273.05

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V.FC 24K BPS EXT W/16550 I/O BOARD 229.64

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SURGEARREST PRO NEW 33.58
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LINE-R 600 ....119.09

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Smart 750 LAN 403.99
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DSP Tech Portable Sound+ 154.34
EAGLE NE200C ETHERNET COAX 238.45
EAGLE NE200T ETHERNET 209.35
IBM TOKEN RING 16/4 ....449.17
INTEL 9600 W/FAX 192.11
INTEL 14.4 W/FAX 201.43
INTEL 24/96 W/FAX 128.92
LINKSYS ETHERNET 10BT 175.15
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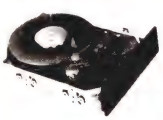

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VA Rating	300	250	250
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LED Status Indicators	YES 3-LED's	YES 2-LED's	NO
Site Wiring Fault Indicator	YES	NO	YES
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On the Islands of Myst, Music, and Multimedia Pedro Meyer

When I overheard my upstairs neighbors (neither of whom has ever talked about a computer game before—at least not where I could hear them) trying to crack a puzzle in Myst, I realized that this Windows CD ROM game must be getting pretty popular. A week later, when I got my own copy and had to restrain myself from sneaking upstairs and begging for clues, I began to understand why.

Myst is a surrealistic experience: It's a combination of near–photo-quality graphics, haunting music and sound effects, and a plot that draws you ever deeper into a maddeningly coherent alternative universe.

You begin on a seemingly abandoned (and rather forbidding) island. As you explore, you discover hidden elevators, underground passages, banks of powerful generators, peculiar scientific instruments, a spaceship in mothballs, and books with very special powers. Your job is to make sense of all this—and the total lack of information just makes the mystery more irresistible.

I ran Myst on a 50-MHz 486 with a triple-speed NEC CD ROM drive, but even this high-end hardware had a hard time crunching what must be an immense amount of code. The game often froze as new scenes loaded, and sometimes it took 10 or 15 seconds for the cursor to reappear. Still, given the complexity of the game (which includes a number of full-motion video sequences and some highly advanced audio), I'm impressed that it runs at all.

The Health of Nations

SimHealth—a learning tool cleverly disguised as a computer game—invites you to play the role of a powerful political leader developing a national health care policy. By letting you experiment with different approaches, SimHealth offers you a rare opportunity to put your own beliefs to the test.

The game starts in 1992, when you decide to run for office and must define your views on health care. Once elected, you get to implement your values—but everything you do costs money, political favors, or both. Your decisions will affect the national economy as well as public opinion, and if the country falls into a depression, or the national debt soars, the voters will probably boot you out of office.

Maxis's SimHealth gives you access to public opinion polls and other sampling techniques, so you can check how you're doing as you play. But the final answer comes in 2008, when the simulation ends: Is the deficit shrinking or growing? Are clinic waiting lines longer or shorter? Is the quality of health care better or worse? Do you still have a job?

Playing SimHealth is clearly good for you, but is it fun? Well, like chess, it takes a lot of concentration. But if you find that shooting down false assumptions is more exciting than blowing away bad guys with a digital burp gun, you won't be bored.

Top 35,000 Countdown

The first time I checked out a computerized database of recorded music in a record store, I discovered three CDs by my favorite jazz musician that I never knew existed. Now the All-Music Guide, a PC-based music database (on disk, not CD ROM), can help you keep current on the hottest hot wax before you hit the store.

This excellent Windows-based reference tool provides you with instant access to record titles and label information. In addition, it offers surprisingly hip record reviews and biographies for more than 6000 artists and 35,000 recordings. I had assumed at first that the All-Music Guide would concentrate only on the most popular performers—Madonna and the Beatles, for instance—but the program is just as good with esoteric New Orleans piano players such as James Booker, and little-known Caribbean groups like Burning Flames.

In Myst, surrealism is the only realism available. And by the way, those valve wheels don't control the water level.

Separate windows open to reveal a list of artists, all the recordings that are available under a selected name, and the artist's complete biography. Clicking on a record title brings up a short review, often by a recognized authority in the field. You can even save time by telling the program which musical genres to display.

Moreover, this program is smart. If you would like to find out whether Duke Ellington and Louis Armstrong ever recorded together, you simply use the Boolean AND/OR search utility to turn up no fewer than three titles. And when I asked about Trinidadian singer Ras Shorty I, the program knew enough to include listings under his old name, Lord Shorty. I have only one complaint:

By Michael Goodwin

THIS IMAGE from I Photograph to Remember/Fotografío Para Recordar is part of renowned Latin American photographer Pedro Meyer's photographic study of his family.

Most of the titles that are listed are available only as LPs, and these days it's almost impossible to buy anything that's not on CD. The All-Music Guide needs a switch that restricts your view to recordings currently in print.

In the Service of Art

As multimedia technology develops, and as the CD ROM user base grows, we will be seeing many serious works of art conceived for this exciting medium. I Photograph to Remember/Fotografío Para Recordar, available through Voyager, is one of the first. This moving meditation on family and the power of memory is based on 100 black-and-white photographs taken by Pedro Meyer, one of Latin America's most acclaimed photographers. Working over the course of three years, Meyer gathered these images of his parents and combined them with thoughtful voice-over narration to create a uniquely poetic piece of art.

The technical aspects of I Photograph to Remember are superb. The photographs appear full-screen as crisp, high-resolution images, and they're accompanied by a sound track that combines Meyer's commentary with a well-produced musical score. A powerful interface allows you to move freely within the piece, and it offers the narration in English or Spanish. But most important, all this high technology is working in the service of art.

This package is not a mass-market item, but it's an exciting sign of a new art form being born.

- **All-Music Guide** $49; Great Bear Software; 800/795-4325
  Reader service no. 615
- **I Photograph to Remember/Fotografío Para Recordar** $39.95; Voyager; 800/446-2001
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- **SimHealth** $29.95; Maxis; 800/824-2643
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Michael Goodwin is a contributing editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).* ■

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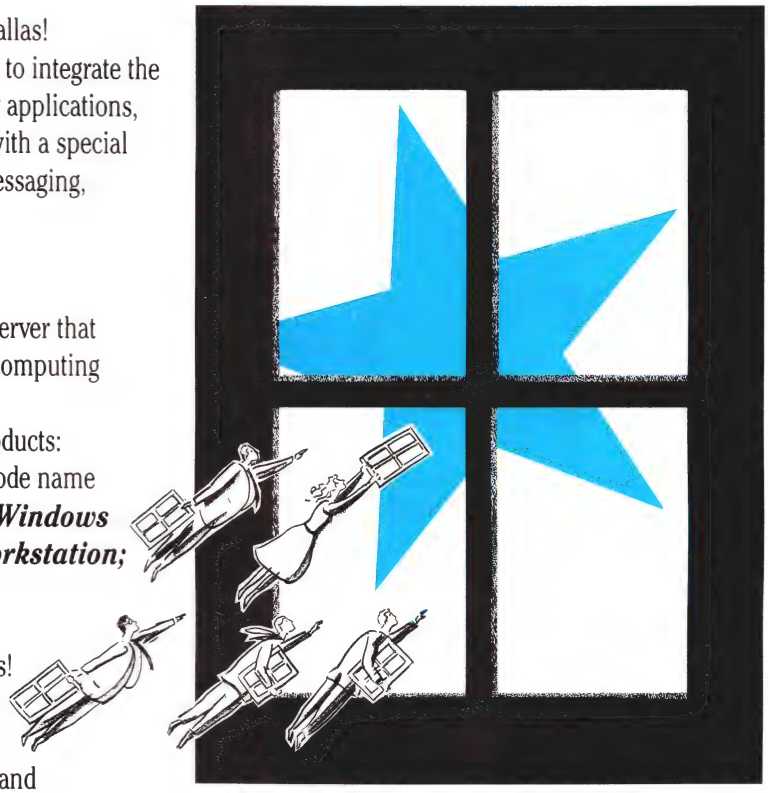

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Home Is Where You're Networked

I don't like working on Saturdays. I prefer to futz in the garden or jog with the dogs, and if I boot a computer at all, it'll be to play Doom—anything but serious stuff. But I knew I was out of luck one recent Saturday when my wife, Judy, asked, "So, um, how's the network coming?" I was hoping she'd forgotten that promise.

When Judy needed to print a file, she would copy it to a floppy and walk it to my computer. It wasn't an elegant system, but it was cheap and it worked. As her printing needs increased—fewer files would fit on a floppy—we tried a few file- and printer-sharing devices, but these too proved wanting (see the *Home Office* column in the May issue for the gory details).

But a network? Just hearing the word made me want to bolt from the room. Instead of running, though, I set out to set up a peer-to-peer network. And now that I've tried it, I kind of like it. (You'll recognize me at parties: I'm the guy bragging that he's networked.)

In peer-to-peer computing, every client can be a server. You string together two or more computers, and everyone can share files, programs, drives (including floppy and CD ROM), printers, and anything else that's attached.

When I set up my network, I connected Judy's computer, my own, and an abandoned 386 that I dedicated to communications. The 386 lets me download big files without slowing down my system.

Plug and Pray

I had immediate and gratifying success with Artisoft's Simply LANtastic. The kit, about $195 on the street, comes with software for two computers, 25 feet of cable, and two internal network cards—everything but the computers and the screwdriver. Surprise, surprise: I installed the hardware on both computers in about half an hour. The network card is jumperless—don't you wish they all were?—and I configured it with software.

I was also surprised at how easy Simply LANtastic is to use. Once the software was installed, Judy's machine appeared as a drive icon in my File Manager. It can't get much easier than that. I can now back up Judy's system to my Tecmar tape drive, she can access Microsoft Bookshelf on my CD ROM drive, and we both print hassle-free. (We tried E-mail, but I found yelling "Hey, Judy" a lot more efficient.)

Simply LANtastic is aimed at really small offices with two to six computers. If you've got more than six stations, you'll get better performance—and more security options—with LANtastic 6.0. And by the time you read this, Artisoft should have an external parallel adapter, letting you network a computer without even opening the case. Sure, it'll be slower, but you won't even need a screwdriver. • *Simply LANtastic $299; Artisoft; 800/233-5564, 602/670-7101 (fax). Reader service no. 666*

Windows at Warp Speed

I couldn't look at just one network environment (my editor wouldn't let me), so I also tried Microsoft Windows for Workgroups 3.11. One thing that tempted me was performance: I had heard that Workgroups' 32-bit file access puts regular Windows to shame—or at least to mild embarrassment.

Installing Windows for Workgroups was easy—it's simply a drop-in replacement for your existing Windows software. And what about performance? I got what felt like a 50 percent jump in speed for disk-intensive tasks. Overall, I found Workgroups' network performance to be faster than Simply LANtastic's. And listen, you don't need to be networked to get this performance boost: Workgroups is worth using even on stand-alone systems. But be forewarned: Its 32-bit file access (the feature that makes it faster) works with most IDE and ESDI hard disk controllers but won't make your SCSI system perform any faster.

You can't buy everything you need for Windows for Workgroups in one box as you can with Simply LANtastic. If you already have Windows, you'll want a copy of the Windows for Workgroups Add-On for each person on the network; I've seen it discounted for about $60. Then you'll need to get network cards on your own; I bought a pair of no-names for about $120 at a local discounter. One more expense: Networking in DOS and Windows requires another add-on program. • *Windows for Workgroups $219.95, Workgroups Add-On $69.95, Workgroups Add-On for MS-DOS $49.95; Microsoft; 800/426-9400, 206/882-8080. Reader service no. 667*

Yet another myth is shattered. There *is* life after a network. And now for the truth, the *real* reason I agreed to install a network: I wanted Judy to play the multiuser version of Doom with me.

Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 12 for contact information).

By Steve Bass

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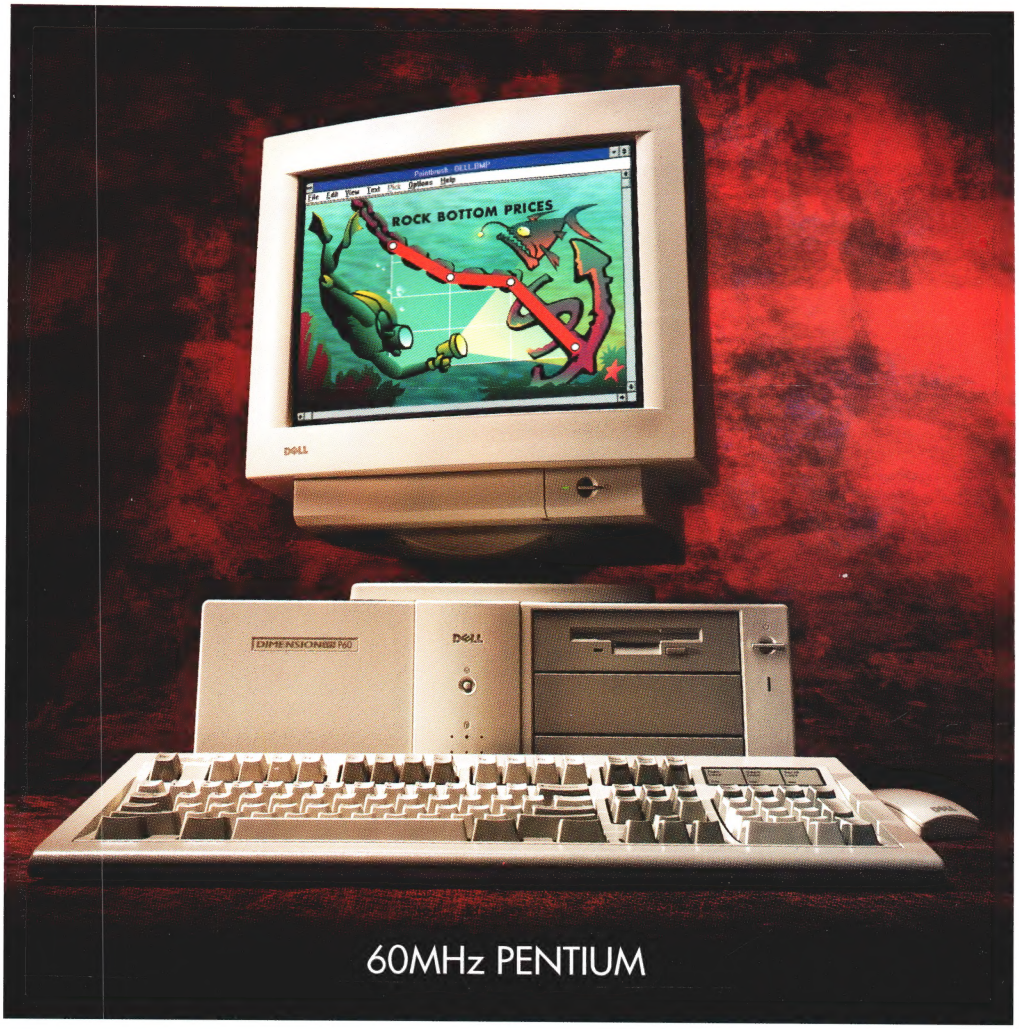

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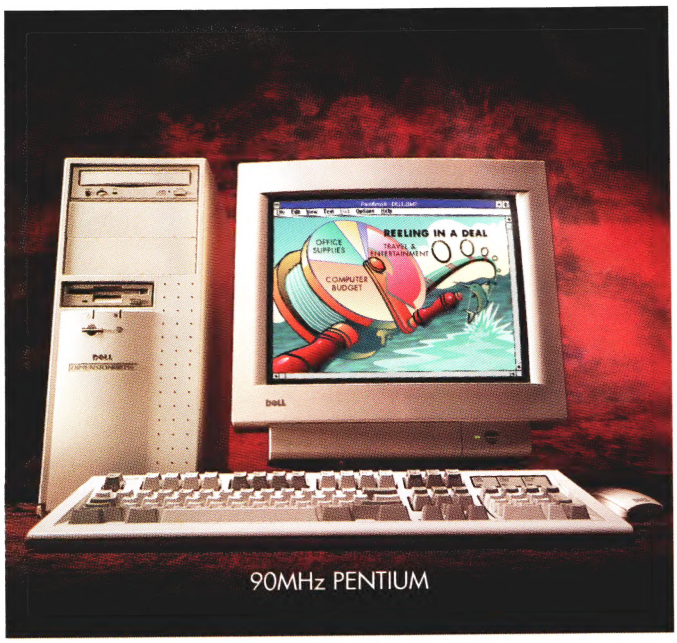

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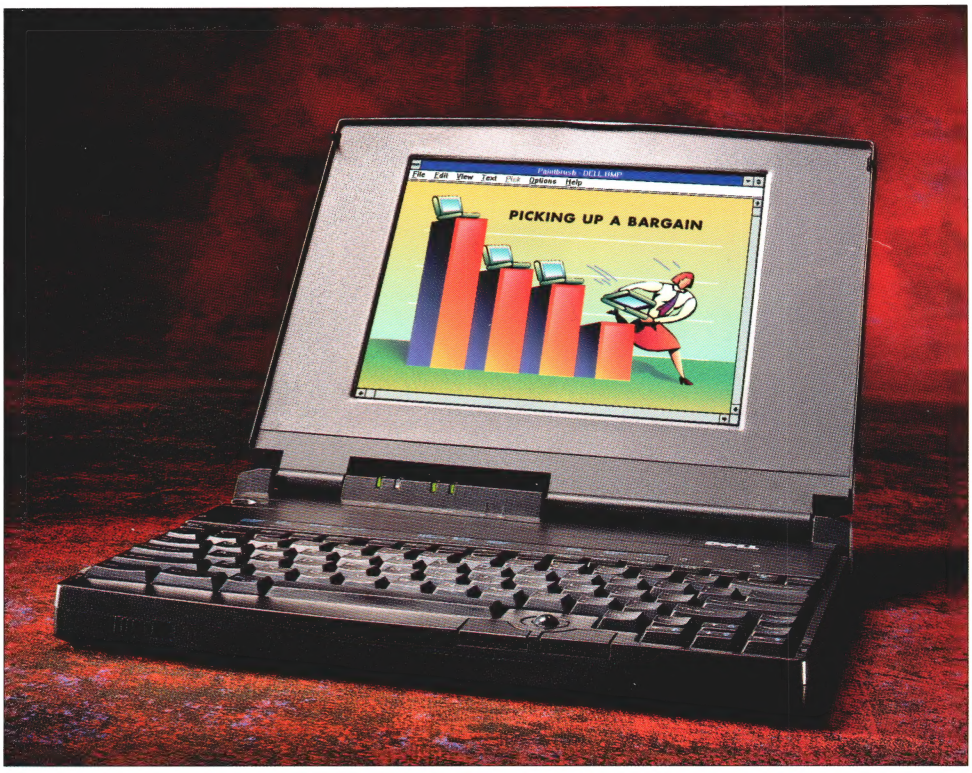

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